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A MONOGRAPH OF THE GENUS STREBLOSA KORTHALS (RUBIACEAE)

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With two text-figures

INTRODUCTION

KORTHALS DESCRIBED in his "Overzicht der Rubiaceën van de Nederlandsch-Oostindische Kolonien" (in Ned. Kruidk. Arch. 2 (2): 245. 1851) i.a. a new genus *Streblosa*, to which he referred Blume's *Psychotria tortilis* and two species based on specimens which he had collected himself in Sumatra and Borneo. Although he gave no explanation of the name, we may safely assume that it refers to the peculiar arrangement of the flowers along the branchlets of the inflorescence which they encircle in the same way in which the shoot of a winding plant twines round its support. Blume's epithet *tortilis* too was apparently inspired by the arrangement of the flowers.

Korthals' generic description contains several inaccuracies; the calyx is not 5-dentate but 5-fid or, more rarely, 5-partite, the corolla-tube is not infundibuliform but cylindrical or, sometimes, in the upper half narrowly campanulate, and it is not glabrous inside but provided with a ring of hairs or with five hair-bundles, the aestivation of the lobes is not subvalvate but quite simply valvate, the ovules are neither peltate nor attached to the centre of the septum but ascending from the inner angle of the ovary-cells, the pyrenes are not plane on the inside but provided with two quite conspicuous contiguous excavations, and the embryo is not amphitropous but straight; the plants moreover are not fruticose but herbaceous, and their inflorescences are not axillary but at first terminal and subsequently pseudo-axillary.

The generic description is followed by a note in which he gives an exposition of the reasons which induced him to separate this genus from *Psychotria*. It is reproduced here in English translation: "On account of

their habit it seemed to me that the generic identity of the species here referred to *Streblosa* with species belonging either to *Psychotria* or to *Grumilea,* already looked dubious, for they differ from them in their membranous, reticulately veined leaves and in the peculiar corymbose inflorescence. The analysis of the flower revealed, in addition to a number of identical features, in the structure of the ovary a diagnostic character of sufficient importance: whereas in *Psychotria* the ovules arise from the bottom of the cells, they are in *Streblosa* attached to the centre of the septum and peltate." The argument derived from the position of the ovules, by which Korthals apparently set great store, and which he thought would justify the creation of the new genus before the tribunal of his fellow botanists, unfortunately was based on inaccurate observation: in reality the ovules of *Streblosa* arise just like those of the other Psychotrieae from the inner angle of the ovary-cells.

Miquel already had some doubts with regard to Korthals' description of the position of the ovules. In his "Flora Indiae Batavae" (2: 294. 1857) he reduced the genus to a subdivision of *Psychotria* for which he retained the name *Streblosa* and which he characterized with the aid of the data provided by Korthals. An interrogation mark, however, is put behind the words with which the attachment of the ovules to the middle of the septum is described. Afterwards Miquel's valuation of the distinguishing characters underwent a change, for in his "Ecloge Rubiacearum Archipelagi Indici" (in Ann. Mus. Bot. Lugd.-Bat. 4: 211. 1869) the genus is reëstablished. As no generic description is given, and as no comment is made on this change of attitude, it is impossible to say how the latter was brought about. It is noteworthy that Miquel corrected in this work Korthals' assertion with regard to the habit of *Str. tortilis* (Bl.) Khs: he himself describes it as an herbaceous plant. Of the two new species described by Korthals only one, the Sumatran *Str. polyantha,* was found by Miquel in the Leiden herbarium (l.c. 262); it seems that the specimen on which the other species, the Bornean *Str. undulata,* was based, had disappeared already, and the type of *Str. tortilis* var. β, collected by Korthals on G. Singalang in West Sumatra, which is said to differ from the form described by Blume in its sessile inflorescences and elliptic leaves, was not met with either; in contradistinction with *Str. undulata* (v. infra) it has never again been mentioned in literature. It may have have been conspecific with one of the Sumatran species dealt with below, but nothing definite can be said with regard to its identity.

Hooker f. reduced *Streblosa* in Benth. et Hook. f., Gen. Pl. 2: 124, 125. 1873, to *Psychotria:* as this author attached great importance to the position of the ovules, it is unlikely that he would have made this reduction if he had not convinced himself of the inaccuracy of Korthals' description. The type-species was referred by Hooker to the section Mapouria (a ebracteatae), where it occupies on account of the persistent bifid stipules, the cincinnate arrangement of the flowers, the small green fruits and the two contiguous excavations on the ventral side of the pyrenes, a most

anomalous position. Korthals' other species are not mentioned, but a plant collected in Penang and in the Wallich herbarium, inserted under the provisional name *Psychotria microcarpa* Wall., is declared conspecific with *Ps. tortilis* Bl., an error which was repeated by King and Gamble in their "Materials for a Flora of the Malay Peninsula" (in Jour. As. Soc. Beng. 72 (2): 11. 1906) and by Ridley in his short survey of the genus *Streblosa* in Jour. As. Soc. Straits 57: 62. 1911. It was corrected by the latter in his "Flora of the Malay Peninsula" (2: 148. 1923).

Baillon referred *Strebiosa* in Adansonia 12: 325. 1879 and in his "Histoire des Plantes" (7: 285. 1880) to *Uragoga* L., which in his delimitation is an even more unwieldy genus than *Psychotria* L. in that of Hooker, and it is therefore not necessary to discuss this reduction. It is noteworthy, however, that he corrected Korthals' assertion with regard to the aestivation of the corolla-lobes. Writing of *Str. tortilis* he stated in Adansonia: "Sur les échantillons que nous avons pu examiner, toutes les corolles étaient simplement valvaires."

Schumann made no mention of the genus *Streblosa* in his monograph of the family in Nat. Pflanzenfam. 4: 4. 1891; and in the "Nachträge" to this work too I have vainly looked for any reference to it. In Dalla Torre & Harms, Genera Siphonogamarum, 503, 1905, however, it is included among the synonyms of *Psychotria*.

Stapf was, after Miquel, the first to recognize the generic distinctness of Korthals' genus. In his paper on the flora of Mt. Kinabalu (in Trans. Linn. Soc., Bot., II. 4: 182. 1894) he described a new species, *Str. urticina*, and expressed himself with regard to its generic position in the following terms: "I think *Streblosa* should be kept up as a distinct genus on account of its peculiar habit, which is produced chiefly by the herbaceous growth, by the very thin leaves, the axillary inflorescences (which in the present species resemble very much those of a common nettle), and by the minute flowers and fruits. Miquel says of *Streblosa* 'frutices'; but the specimens of *S. tortilis* (Bl.) Korth., the only species seen by him, are decidedly herbs. The genus *Streblosa* is limited to Malaya." The statement that the inflorescences are axillary, is incorrect: in reality they are terminal but soon pushed aside by an axillary branch developing in the axil of one of the two highest leaves. The reference to Miquel is incomplete: in the "Flora Indiae Batavae" the latter merely repeated Korthals' statement, but in his paper in the "Annales" he described *Str. tortilis* correctly as "herba basi radicans."

The next author who recognized *Streblosa* as a distinct genus, was Valeton. In Bot. Jahrb. 44: 568. 1910, he described a new species, *Str. glabra*, based on a specimen collected by Winkler (Breslau) in South-east Borneo; it appears very close to *Str. urticina* Stapf. At the same time he gave a more detailed description of *Str. undulata* Khs., based on some other specimens collected by Winkler in the same region as *Str. glabra* and as Korthals' type. Whether these specimens really are conspecific with the latter, is difficult to say, because of Korthals' incomplete description, but

it should be noted that the leaves are elliptic according to Korthals, whereas Valeton states that they are 90–120–150 mm. × 35–50 mm., which means that they are lanceolate in his specimens. However, as there is little chance that Korthals' type will ever be recovered, and as there is otherwise nothing in his description which positively excludes the possibility that his type was conspecific with the specimens described by Valeton, the latter's interpretation may perhaps be accepted.

At about the same time *Ridley* (in Jour. As. Soc. Straits 57: 62. 1911) devoted a few pages to *Streblosa*. He agreed with Stapf that the genus should be restored, but no new arguments were brought forward to support this view. He recognized seven species, i.e. apart from the three for which the genus was created and the one described by Stapf, three new ones. Of these three the first, *Str. hirta,* is probably identical with *Str. polyantha* Khs., of which Ridley had seen no material. The only difference which I can find in comparing Korthals' specimens with Ridley's description, lies in the slightly narrower leaves (10–15 cm. × 3.7–5.0 cm. instead of 9–12 cm. × 4.5–5.7 cm.). In the description of *Str. pubescens* Ridl. there are a few points which make the position of this species altogether dubious: the stipules are said to be lanceolate-acuminate, whereas in this genus they are always two-lobed; the stamens should be inserted near the base of the tube instead of in the ring of hairs in the middle or somewhat above the middle, the stamens as well as the style should be included, whereas the flowers of *Streblosa* are always heterostylous with either the stamens or the style exserted, and the disc is said to be composed of 5 reniform bodies, whereas I found it in *Streblosa* always semi-globose or annular with a single, more or less distinct, transverse impression on the top. For the time being, therefore, I consider *Str. pubescens* a "species incertae sedis." The third species, *Str. bracteata,* on the other hand, is a true representative of the genus, probably nearly related to the plant afterwards described by Merrill under the name *Str. myriocarpa*. Like the latter it is found in West Borneo. Ridley remarked with regard to *Str. urticina* Stapf that he saw in the herbarium of the Botanic Gardens, Singapore, a specimen collected by Haviland and bearing the number of the type, which was "decidedly woody," whereas Stapf described it as "herbaceous and scandent." Ridley was right in so far that the plant is certainly no climber, and that it is woody at the base: as secondary thickening, however, is by no means uncommon in the basal parts of the stems of dicotyledonous herbs, this is no valuable argument against its herbaceous character.

In the following year Elmer (Leafl. Philipp. Bot. 4: 1356. 1912) published some remarks on a plant which he had collected in the island Palawan, and which he referred to *Str. glabra* Val. It differs, however, conspicuously from the latter by the nature of the stipules, whose lobes are separated from each other by a rather wide gap instead of being contiguous. His remarks contain several mistakes: the valvate corolla-lobes are described as imbricate and slightly twisted from left to right;

the stamens are said to be inserted in the basal part of the corolla-tube, and the anthers should be more or less united, the stigma "submitraform," the ovary "superior or nearly so, surrounded by 5 lobular disk appendages," and the ovules should be pendulous. That the genus is said to be monotypic and previously known from Borneo only, may be regarded as a slip of the pen.

In the same year Valeton (in Icones Bogorienses 4: 139, t. 343. 1912) published a detailed description of *Str. tortilis* (Bl.) Khs., accompanied by a plate which unfortunately is not entirely satisfactory. His ideas on the generic characters are summarized in the following sentence: "Le port de la plante, les inflorescences axillaires, l'insertion scorpioide des fleurs sur les rameaux (voir la figure 2 dans la table citée de Stapf) et la structure du fruit sont autant de caractères de valeur générique et qui séparent la *Streblosa* du genre *Psychotria*." Valeton therefore was the first to recognize the taxonomic importance of the monochasial structure shown by the ultimate ramifications of the inflorescence, and although he calls the latter here for sake of convenience axillary, the remarks in his paper in Bot. Jahrb. 44: 568. 1910, show that he knew very well that they are in reality at first terminal and afterwards pseudo-axillary.

A few years later Merrill (in Philipp. Jour. Sci. Bot. 10: 141. 1915) described under the name *Str. axilliflora*, a new species from the Philippines. In a short note attached to the description he remarks: "I am in agreement with Valeton and with Ridley in considering *Streblosa* Korthals to be a valid genus. In aspect the plants are entirely different from *Psychotria* and *Grumilea,* and the differential characters appear to be constant. From all our representatives of *Psychotria* and *Grumilea* the present species is distinguished by its minute fruits and axillary inflorescences; surely, if *Grumilea* is to be separated from *Psychotria,* there are as great or greater reasons for distinguishing *Streblosa* as a valid genus." Merrill afterwards (Enum. Philipp. Fl. Pl. 3: 564. 1923) identified the Philippine species with *Str. glabra* Val., but this was an error: it differs from the Bornean species in the same way as the plant collected by Elmer in Palawan, the stipular lobes namely are not contiguous but separated from each other by a rather wide gap, and the internodes are ecostate.

Since then one new species was described from the Malay Peninsula by Ridley and eight from Sumatra and Borneo by Merrill. With regard to our knowledge of the generic characters however, no further progress was made. In this paper a detailed analysis of the generic characters is given. Twenty-five species are described, and an attempt is made to arrange them in a more or less natural sequence. Eleven of the twenty-five species are new, whereas three of the old ones, namely *Str. hirta* Ridl., *Str. platyphylla* Merr. and *Str. puberula* Merr. are reduced to synonymy, and one, *Str. pubescens* Ridl., set apart as a "species incertae sedis." Of *Str. urticina* Stapf and of *Str. palawanensis* Brem. two varieties are recognized, and of *Str. axilliflora* Merr. three.

GENERIC DESCRIPTION

Streblosa Khs. in Ned. Kruidk. Arch. 2 (2): 245. 1851; Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 211, 262. 1869; Stapf in Trans. Linn. Soc. Bot. II, 4: 182. 1894; Val. in Engl., Bot. Jahrb. 44: 567. 1910; Ridl. in Jour. As. Soc. Straits 57: 62. 1911; Val. in Ic. Bog. 4: 141. 1912; Elmer, Leafl. Philipp. Bot. 4: 1356. 1912; Merr. in Philipp. Jour. Sci. Bot. 10: 141. 1915, Enum. Philipp. Fl. Pl. 3: 564. 1923; Ridl., Fl. Mal. Pen. 2: 148. 1923; Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929; Lemée, Dict. Pl. Phan. 6: 335. 1935; Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 295. 1937, in Papers Mich. Acad. Sci. 22: 194. 1938.

Psychotria spec. Bl., Bijdr. Fl. Ned. Ind. 958. 1826; DC., Prodr. 4: 520. 1830; Miq., Fl. Ind. Bat. 2: 294. 1857, Suppl. 223, 1860; Hook. f. in Benth. et Hook. f., Gen. Pl. 2: 124, 125. 1873; Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1899; Dalla Torre & Harms, Gen. Siph. 503. 1905; King & Gamble in Jour. As. Soc. Beng. 72 (2): 11. 1906.

Uragoga spec. Baill. in Adansonia 12: 325. 1879; Hist. Pl. 7: 285. 1880.

Genus *Psychotriearum* caule sympodiali plerumque simplici, inflorescentiis primum terminalibus, deinde pseudo-axillaribus et ergo semper solitariis ad nodos, ramulis ultimis inflorescentiae quoque nodo floribus duobus instructis, florum paribus cincinnaliter dispositis, fructibus parvis et viridibus, globosis vel didymis, in mericarpia duo discindentibus, mericarpiis drupaceis, pyrenis dorso 3-costatis, facie ventrali excavatis et excavatione a carina mediana plus minusve distincta in partes duas divisa a generibus aliis ad tribum hanc pertinentibus distinguendum.

Herbae plerumque simplices, raro semel vel bis pseudo-dichotome furcatae, erectae vel saepius ascendentes, casu quo parte decumbente haud raro radicante et interdum ex axillis innovationes emittente. Caulis sympodialis. Folia opposita, quoque pari aequalia, petiolata; petiolus foliorum inferiorum plerumque satis longa et foliorum aliorum gradatim longitudine decrescens; lamina magna, plerumque tenuis, discolor, supra semper idioblastis in appendicem lenticularem vel conicam productis vix conspicue et interdum cellulis resiniferis valde conspicue punctata, subtus haud raro protuberantiis stomatiferis albido-lepidota, venulis paucis, laxe reticulatis. Stipulae interpetiolares in lobos duos exeuntes. Inflorescentiae plerumque plures quarum una terminalis et aliae solitariae ad nodos, i.e. primum terminales sed mox a ramulo axillari qui folia bina et inflorescentiam novam prodet in positionem pseudo-axillarem coactae, breviter vel rarius longe pedunculatae, ramulis plerumque 3 vel 5, subumbellatis, infimis interdum iterum in ramulos 3 divisis, casu quo ramuli 9 paniculatim dispositi, ramulis ceterum haud raro semel dichasialibus, ramificationibus monochasialibus, raro inflorescentia tota semel vel bis dichasialis, ramificationibus monochasialibus, vel tota monochasialis. Monochasia quoque nodo floribus duobus instructa, florum paribus cincinnaliter dispositis. Bracteae forma et magnitudine diversae sed semper evolutae, interdum ad anthesin deciduae. Flores pedicellati vel subsessiles, semper 5-meri et heterostyli. Ovarium biloculare, loculis ovulo singulo ex angulo interiore ascendente instructis. Calyx plerumque 5-fidus, lobis triangularibus, ovato-triangularibus vel rotundatis, rarius 5-partitus, casu quo lobis interdum imbricatis. Corolla alba, maxime 8 mm. longa sed plerumque multo brevior, breviter hypocrateriformis, tubo interdum dimidio superiore paulum inflato, lobis valvatis, tubo intus ad medium vel supra medium annulo vel fasciculis 5 pilorum instructo. Stamina in annulo vel

inter fasciculos pilorum inserta, in flore longistylo subinclusa, in flore brevistylo exserta; filamenta glabra; antherae oblongae, dorsifixae. Granula pollinis globosa, minute reticulata, 3-pora. Discus semi-globosus vel annularis, apice interdum sulco instructus, glaber. Stylus glaber, in flore brevistylo inclusus, in flore longistylo exsertus; stigmata filiformia vel linearia, patentia, in flore longistylo apice recurvata. Fructus parvus, minus quam 3 mm. diam., viridis, globosus vel didymus, calyce persistente et disco plus minusve exsiccato coronatus, in mericarpia duo discindens; mericarpia drupacea; pyrenae dorso 3-costatae, facie ventrali excavatae, excavatione a carina mediana plus minusve distincta in partes duas divisa, endocarpio tenui. Semen endocarpio conforme, testa rubra vel rubro-maculata, albumine uniformi corneo, embryone recto parvo, radicula inferiore.

Species adhuc notae 25, distributae in Peninsula Malayana, Sumatra, Java, Borneo, Insulis Filippinis, ubi in umbris nemorum crescunt.

Species typica: *Str. tortilis* (Bl.) Khs.

The stems are either erect or, more often, ascending, and there is doubtless a certain amount of vegetative propagation, young plants developing sometimes from the axils of the fallen leaves in the decumbent and rooting basal part. Even in those species that are provided with erect stems, for instance in *Str. Johannis-Winkleri* Merr., in which this kind of growth is perhaps most pronounced, I have sometimes found remains of old shoots at the base of the young ones. I suppose that in these plants the whole stem sinks down after the last fruits have ripened, and that here too new stems develop from axillary buds. That these innovations are but rarely met with in herbarium specimens, probably means that they are not regularly formed. In some of the species with ascending stems, especially in those in which the leaves do not show much difference in shape and size, e.g. in *Str. tortilis* (Bl.) Khs. and in *Str. bullata* Merr., development might even be continuous, the oldest part of the stem gradually decaying and the bent at the same time shifting in the direction of the younger parts: in such species innovations are perhaps formed only when the normal development in some way or other is checked.

Ramification is extremely rare: so far it has been observed in three species only, in *Str. lampongensis* Brem., *Str. chlamydantha* Brem. and *Str. longiscapa* Brem. It is always brought about in the same way, namely by the development of two axillary shoots instead of one at the base of an inflorescence. This is rather interesting from a morphological point of view, for it definitely proves the terminal nature of the inflorescence: without the evidence of the forked plants the latter would always remain somewhat dubious, for the terminal position of the young inflorescence might be spurious, and the presence of but one inflorescence at each node is in itself no sufficient proof.

In habit the *Streblosa* species therefore are not unlike those belonging to the genus *Notopleura* Brem. (*Psychotria* L. sect. *Notopleura* Hook f. in Benth. & Hook. f., Gen. Pl. 2: 124. 1873, cf. Brem. in Rec. d. trav. bot. Néerl. 31: 289. 1934), for the species of that genus too are herbaceous and

provided with usually simple, sympodial stems, the terminal inflorescence being pushed aside by an axillary shoot developing from the axil of one of the leaves at its base. In other respects, however, there are important differences. In *Notopleura* the leaves are succulent, the stipules undivided, the inflorescences paniculate or corymbose, the flowers ebracteate, the corolla-lobes imbricate, and the pyrenes dorsiventrally compressed and on the inner side flat or provided with a prominent keel; the genus, moreover, is confined to Tropical America. The affinity between *Streblosa* and *Notopleura,* therefore, must be regarded as rather remote.

Although the stems probably do not last for more than a few months, there is often a considerable amount of secondary thickening in their basal parts. As a rule the increase is almost entirely due to the formation of secondary xylem, but in the species described below under the numbers 1–11, there is also a considerable development of secondary bast. The formation of cork is, as a rule, but weak, and in most species the stem, therefore, remains green.

As in most of the plants belonging to the undergrowth of the forest, the leaves are, as a rule, large, flat, thin and discolorous. In the majority of the species belonging to the subgenus *Eu-streblosa* (*Str. tortilis, Str. myriocarpa, Str. maxima, Str. Johannis-Winkleri, Str. bullata, Str. bracteolata, Str. anambasica, Str. polyantha,* and to some extent in *Str. deliensis* and *Str. scabridula*) the underside of the leaves is covered with greyish scales, which under the microscope prove to be dome-shaped excrescences crowned by a stoma, an arrangement which apparently is not uncommon in shade plants. Taxonomically of more importance is the structure of the epidermis on the upper side. As in *Psychotria* the latter consists of straight-walled cells, but in the midst of these some much smaller ones are found which are produced above the common surface into lenticular or conical excrescences (fig. 1). The latter are often difficult to detect with the naked eye, but appear to be present in all species. In the other genera of the Psychotrieae I have looked, so far, in vain for them. Far more conspicuous are the reddish or black dots with which the upper side of the leaves of *Str. tortilis, Str. microcarpa, Str. polyantha,* and probably those of *Str. multiglandulosa,* which I could not investigate myself, are marked. These dots are caused by the presence of a dark-coloured resin in some of the epidermis cells. As a rule they are in these species a very conspicuous feature, but as a differential character they are of little value, for their development varies considerably, even in leaves of the same specimen; in some instances the cells contain little or no resin, and as the cells themselves are indistinguishable from the rest of the epidermis cells in shape and size, microscopical investigation too is in such cases of no avail. Of *Str. tortilis* and *Str. microcarpa* I have seen specimens in which the dots appeared to be completely absent.

Resin may also be present in some of the cells of the mesophyll and in the mesocarp of the fruit, and even in other parts of the plant, for instance in the cortex and in the secondary bast of the shoots; in the latter these

cells are arranged in short longitudinal rows. Their number varies considerably, and they are not always easy to detect, but it is almost certain that they are nowhere completely absent. One of the most suitable places to look for them, is the connective. In the species 1–6 they are a conspicuous feature of the secondary bast. When they are present in the mesophyll, the leaves are, as a rule, more or less distinctly marbled. It is noteworthy that such marbled leaves occur also in some related plants, e.g. in the Madagascar species of *Psychotria*.

Raphide-cells are in some species a conspicuous feature, whereas in others they are difficult to detect. This depends apparently on the consistency of the leaves, for microscopical investigation reveals that they are nowhere absent. As a matter of fact, they are a general feature of the whole tribe, and are also found in some of the latter's allies, for instance in the Hedyotideae, whereas they are constantly absent in the Ixoreae and their allies, which, as I have pointed out in my "Monograph of the genus

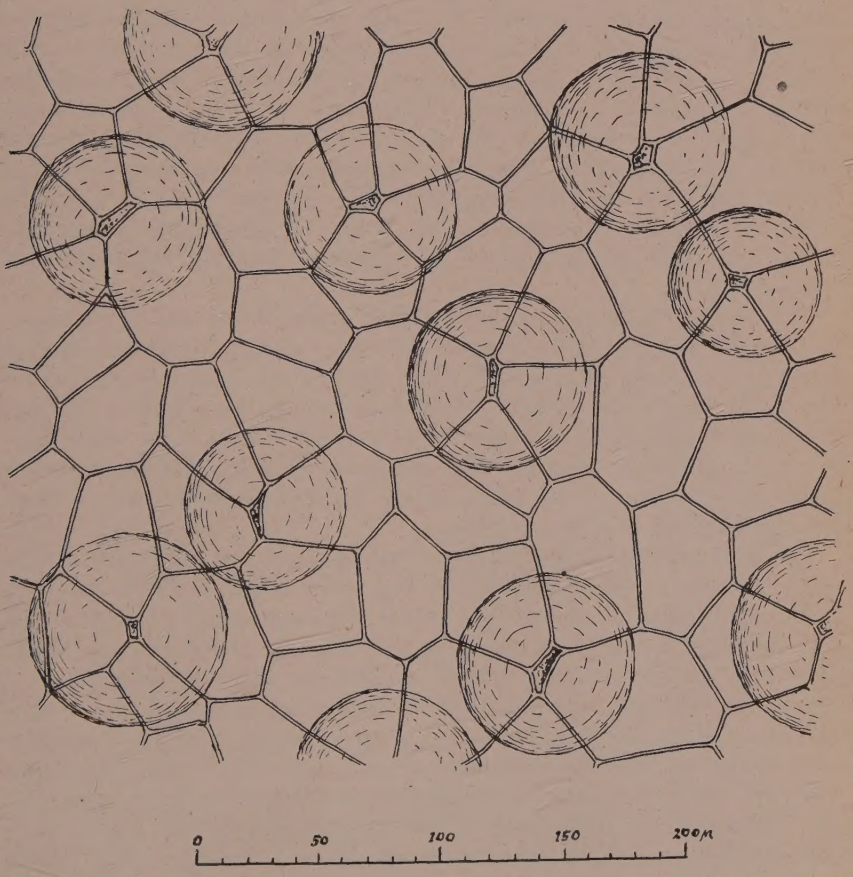


FIG. 1. Epidermis of the upper side of the leaf of *Streblosa myriocarpa* Merr.

Pavetta" (in Fedde's Repert. 37: 11, 12. 1934), form another circle of affinity.

The nervation of the leaves is very uniform; the meshes formed by the lateral nerves and the venules are large and more or less irregular in outline. Acaridomatia are always absent.

The stipules are always interpetiolar and produced into two lobes, but they vary considerably in size and shape. In the species belonging to the subgenus *Eu-streblosa* they are much larger than in the subgenus *Para-streblosa,* and in the first-named subgenus the basal part is stronger developed than the lobes, whereas in the species belonging to the latter the lobes are better developed than the basal part; in *Eu-streblosa* they are moreover more or less persistently ciliate or ciliolate, whereas in *Para-streblosa* they are eciliate. In part of the species belonging to the latter the basal part shows a prominent midrib which runs down to the preceding node. In these species, which form the series *Costatae,* the lobes are moreover contiguous, whereas in the two other species, which are brought together in the series *Ecostatae,* the midrib is invisible and the internodes accordingly ecostate, and the lobes are separated from each other by a wide gap. Costate stipules are found also in some of the species belonging to the subgenus *Eu-streblosa,* but only in one of them, *Str. Johannes-Winkleri* Merr., the rib runs down along the stem. In the other species all the nerves arise from the angles of the stipule and converge towards the top of the undivided part, where they enter the lobes. As in many other genera belonging to this family, a fairly large number of colleters is found in the axils of the stipules. They are in this genus rather large.

The inflorescences are always of terminal origin, but by the development of a branch from the axil of one of the leaves at their base, they are, as stated above, soon pushed aside. They are, as a rule, shortly pedunculate, but in *Str. tortilis* the peduncle is about as long as the petiole of the leaf at its base, and in *Str. longiscapa* it is even about as long as the whole leaf. In these two species the peduncles are moreover erect, whereas they are in the other species of the subgenus *Eu-streblosa* recurved, and in those belonging to *Para-streblosa* patent.

The inflorescences themselves show various degrees of complexity. The simplest form is that found in *Str. bracteolata* Merr.: it consists of a single axis bearing at each node a sterile bract and a pair of flowers, one provided with a bract and the other ebracteate. The ebracteate flower might be regarded as a superposed one, and the whole inflorescence as a raceme, but it seems more plausible to regard the ebracteate flower as a terminal one, and the bracteate flower as representing one of the branchlets of a dichasium, the other branchlet forming the continuation of the axis (fig. 2). This interpretation is supported by two weighty arguments: (1) the ultimate ramifications of the inflorescences of the Psychotrieae are everywhere of the dichasial type, and there is therefore every reason to assume that those of *Streblosa* will be of the same or at least of a

related kind; (2) in almost all the other species of *Streblosa* the branchlets are at least partly arranged in pairs with a single flower in the fork between them, which means that they themselves are parts of a dichasium, and it is a well-known fact that the branchlets of a dichasium often develop into monochasia, whereas there are no fully authorized examples of dichasia developing into racemes or spikes. The flower-pairs are arranged in such a way that a line connecting the successive pairs would twine round the axis like the shoot of a winding plant. The arrangement of the flower-pairs, therefore, is cincinnate. The inflorescence, however, is not a simple cincinnus, for in a cincinnus we find but one flower at each node. For the same reason it is not exactly a monochasium, although we will use this term here for the sake of convenience, but more or less intermediate between the latter and the dichasium.

In *Str. bullata* Merr. the inflorescence is twice dichasially branched with rather long-pedicellate flowers in the forks, but after the second bifurcation

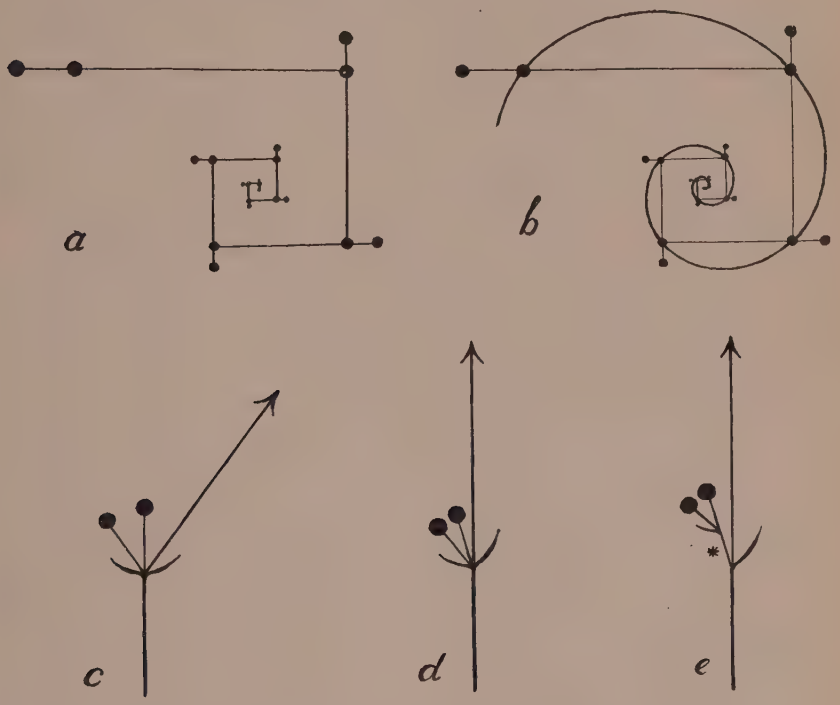


FIG. 2. Diagrams illustrating the structure of the monochasial branchlets. *a.* vertical projection; *b.* the same, but the terminal flowers connected by a spiral line representing the axis; this figure shows perhaps better than *a* why the lateral flowers do not stand before the terminal ones, but more or less beside them; *c.* the lateral shoot which is to form the continuation of the inflorescence axis in the position which theoretically it ought to have; *d.* the condition found in *Para-streblosa;* *e.* the condition found in *Eu-streblosa;* at * the "interbracteal" node.

the branchlets develop in the same way as the inflorescence of *Str. bracteolata.*

In the other species we find three or five subumbellately or, rarely, racemosely arranged branchlets, of which the lowest pair are sometimes in their turn provided with a pair of lateral branchlets; the main branchlets as well as those of the second order may be once dichasially ramified, but the prongs of these dichasia, or the branchlets themselves if they are unforked, are monochasial.

The monochasial structure of at least a part of the inflorescence, is a character of great taxonomic importance, for this arrangement is found nowhere else in the Psychotrieae.

It is in cymous inflorescences always somewhat difficult to make out how the terms bract, bracteole and pedicel should be used, but if we stick to the principle that the bud in the axil of a bracteole remains rudimentary, we may find a way out of the difficulty, for in this case the only hypsophylls to which the name could be applied, would be the ultimate ones in whose axils the flowers remain rudimentary, but as these hypsophylls are indubitably homologous with the other ones, there is obviously no reason to give them another name: in the cymous inflorescences there are therefore no bracteoles. When this is conceded, the determination of what should be called pedicel, offers no difficulty: in a dichasium it is obviously the axis which begins at the insertion of the dichasial prongs or at the insertion of the bracts in whose axils the latter develop. In a monochasium the base of the pedicel is accordingly recognizable at the insertion of the bract or of the bract-pair. In *Streblosa* the matter is somewhat complicated by the circumstance that the two bracts which one would expect to find at the same height, are in reality often inserted at different heights. This means that between the two of them an extra internode has developed, which we will call the interbracteal internode. The shoot which forms the continuation of the axis of the monochasium develops always from the lower bract, which, as a rule, is somewhat larger than the other one, in whose axil the lateral flower develops. In the subgenus *Eu-streblosa* the interbracteal internode is always easily recognizable, whereas in *Para-streblosa* it is either absent or indistinct. In *Para-streblosa* the flowers, moreover, are always subsessile, whereas in *Eu-streblosa* subsessile flowers are met with in *Str. tortilis* and in *Str. microcarpa* only; in the other species they are distinctly pedicellate. Because of the presence of the interbracteate internode the flower-pairs of *Eu-streblosa* give one the impression of being stipitate, and for the sake of convenience, this term has been used in the descriptions of the various species.

The flowers are always 5-merous and heterostylous. It is true that those of *Str. urticina* were described by Stapf as 4-merous, but this is a mistake: in the drawings on the plate accompanying his description they are correctly shown as 5-merous. They are as a rule very small. The largest ones which I could investigate, are those of *Str. bracteolata,* which reach a length of 9 mm.; in several other species they vary between 2.5

and 3.5 mm. Heterostyly is very often met with in the Psychotrieae and their allies; it occurs, for instance, also in the Hedyotideae. It is, however, no general feature of these tribes. The ovary is always bilocular and, as everywhere else in the Psychotrieae, each cell contains a single ovule ascending from the angle between the bottom of the cell and the septum.

The calyx consists of a short tube and five usually short, broadly triangular, ovate-triangular or suborbicular, rarely somewhat longer and then oblong, lobes, alternating with baculiform glands. The latter are like the previously mentioned raphides and the tendency to heterostyly a general feature of the Psychotrieae and of some of the related tribes, e.g. of the Hedyotideae. The aestivation of the calyx-lobes is usually more or less open or subvalvate; the large calyx-lobes of *Str. chlamydantha* Brem., however, are distinctly imbricate.

The corolla is always white, and consists of a short cylindrical or, in the upper half, above the insertion of the stamens, slightly widened tube and five spreading lobes, valvate in the bud. In the middle or somewhat above the middle the tube is provided with fairly long hairs. In *Eu-streblosa* the latter form a complete ring, whereas in *Para-streblosa* they are arranged in five bundles alternating with the stamens.

The stamens are inserted at the same height as the hairs. In the long-styled flower they are more or less included, and in the short-styled one exserted. The filaments are always glabrous, and the anthers oblong and dorsifixed. The pollen grains are small, globose, 3-porous and minutely reticulated.

The disk is, as a rule, fairly large, semi-globose or annular, and glabrous. At the top it shows a transverse impression corresponding in position with the septum in the ovary.

The style is thin and glabrous, and ends in two filiform or narrowly linear stigma-lobes. In the short-styled flower it is included, and the stigma-lobes are but slightly spreading, whereas in the long-styled flower it is exserted, and the stigma-lobes are more distinctly spreading and at the top sometimes recurved.

The fruits are very small, smaller, in fact, than anywhere else in this tribe, and in size and shape more like those of *Hedyotis, Lerchea* or *Xanthophytum* than like the drupes of the other Psychotrieae. They are either globose or, more often, didymous, crowned by the persistent calyx and the somewhat shrunken disk, and they remain always green. When fully ripe, they split into two drupaceous mericarps, which in the herbarium are distinctly costate, but in the fresh condition smooth. The mesocarp is but weakly developed, and the endocarp too is thin. The pyrenes vary in colour between yellowish, red and almost black, and they are usually 5-ribbed, three of the ribs ornamenting the convex side, and the two others marking the border of the latter; the flat inner side shows in the centre an excavation, which a more or less distinct keel divides into two parallel or upwards somewhat divergent hollows. The keels may be

acute or obtuse, and the excavation on the flat side varies in the various species somewhat in size and shape, but the differences are difficult to describe, and they are therefore not mentioned in the descriptions. The seed shows exactly the same sculpture as the pyrene, and consists of a thin, red or red-dotted testa and a uniform horny endosperm. The embryo is small and nearly straight, and the radicle points downwards.

The shape and sculpture of the pyrene, and the way in which the testa surrounds and eventually penetrates the endosperm, are important diagnostics for the genera belonging to the *Psychotria* group. *Streblosa* is for instance easily distinguishable from *Mapouria* Aubl., to which the type-species was referred by Hooker in Benth. & Hook. f., Gen. Pl., by the presence of the two contiguous hollows on the ventral side of the pyrene, and from *Psychotria* L. in the delimitation in which it is taken by me (cf. Brem. in Jour. Bot. 71: 273. Oct. 1933, and in Pulle's "Flora of Suriname" 4: 261. 1934) by the absence of the median groove on the ventral side of the pyrene and the corresponding intrusion of the testa into the seed. Apart from the difference in size, the pyrenes of *Streblosa,* however, are very similar to those of *Geophila* Don; the fruits of the latter, on the other hand, are not only larger but also more fleshy, and coloured instead of green. The pyrenes of *Notopleura,* the genus which resembles *Streblosa* in habit, are dorsiventrally compressed, and their ventral side is either entirely flat or provided with a protruding ridge, but the latter does not arise from the bottom of a cavity. Of these plants too the fruits are coloured and larger and more fleshy than those of *Streblosa.*

Within the genus *Streblosa* itself two slightly different kinds of fruit are met with. In the subgenus *Eu-streblosa* and in *Str. chlamydantha* and *Str. longiscapa* the mericarps are nearly globose, and the fruits therefore didymous, but in the other species of *Para-streblosa* the mericarps are semi-globose, and the fruits accordingly globose: in herbarium material the latter are 8–ribbed, whereas the didymous fruits are either 6- or 10-ribbed. In the species which are normally provided with didymous fruits, occasionally some globose ones are found; the latter are 5-ribbed and owe their aberrant shape to the abortion of one of the mericarps.

CLASSIFICATION OF THE SPECIES[1]

The genus has here been divided into two subgenera. In *Eu-streblosa* the stipules are wider than the stem, and their basal part is more strongly developed than the lobes, the flower-pairs are distinctly stipitate, i.e. the interbracteate internode is always developed, the hairs in the corolla-tube form a complete ring, and the fruits are always didymous. In *Para-streblosa,* on the contrary, the stipules are not wider than the stem, and their lobes are better developed than the basal part, the flower-pairs are

[1] The abbreviations for the herbaria of the institutions cited in this paper are as follows: AA = Arnold Arboretum; BZ = Buitenzorg Botanic Garden; HBG = Inst. Allg. Bot., Hamburg; K = Royal Botanic Gardens, Kew; NY = New York Botanical Garden; U = Bot. Mus. Utrecht.

subsessile, i.e. the interbracteate internode is either absent or but indistinctly developed, the hairs in the corolla-tube are arranged in five bundles, and the fruits are usually globose; didymous fruits, however, are found in *Str. chlamydantha* and in *Str. longiscapa*.

A further subdivision of *Eu-streblosa* does not lead to results which are of practical value, the groups becoming too small. The first two species, *Str. tortilis* (Bl.) Khs. and *Str. microcarpa* Ridley with their subsessile flowers, are doubtless nearly related, but *Str. lampongensis* Brem., a species with distinctly pedicellate flowers, shows in the structure of its stipules with their comparatively long lobes, an unmistakable likeness with these two species. The next three species, *Str. bracteata* Ridl., *Str. myriocarpa* Merr. and *Str. maxima* Brem., form another natural group, characterized by large leaves and very large, oblong or obovate stipules. Ovate or ovate-lanceolate stipules provided with a prominulous or prominent midrib characterize a group of Bornean species, to wit *Str. Johannis-Winkleri* Merr., *Str. bullata* Merr. and *Str. bracteolata* Merr., to which the less known species *Str. multiglandulosa* Merr. and *Str. undulata* Khs. interpr. Val. probably also belong. A somewhat isolated position is occupied by *Str. anambasica* Brem.; in the small size of the flowers it resembles the Sumatran species which form the next group, but it differs conspicuously from this group by the more strongly ramified inflorescences. The five Sumatran species, *Str. deliensis* Brem., *Str. hypomalaca* Brem., *Str. leiophylla* Brem., *Str. polyantha* Khs. and *Str. scabridula* Brem., are provided with ecostate stipules, and possess inflorescences with three undivided branchlets and very small flowers.

In *Para-streblosa* two series may be distinguished: the *Costatae* with conspicuously costate stipules and bicostate internodes, and the *Ecostatae* with ecostate stipules and smooth internodes; in the first series the stipular lobes are contiguous, whereas in the second they are separated from each other by a wide gap. The first are confined to Borneo, whereas the second group is found in Palawan and other islands of the Philippines. The latter comprises at present but two species, one consisting of two, and the other of three varieties, but it is not impossible that further study will show that these varieties are sufficiently distinct to be regarded as species. Among the *Costatae, Str. chlamydantha* Brem. and *Str. longiscapa* Brem. occupy a more or less isolated position. They are provided with didymous fruits, and their calyx-lobes are larger than in the other species.

KEY TO THE SPECIES

a. The undivided part of the stipules wider than the stem and at least 2 mm. high, but, as a rule, much higher. Hairs in the corolla-tube in a complete ring. Fruits always didymous. — Species from the Malay Peninsula, Sumatra, Java and Borneo.

Eu-streblosa

b. Stipules with an ovate base and two slightly spreading lobes, which are longer than the base. Flowers either sessile or pedicellate, but the pedicels never more than 0.6 mm. long.

c. One of the flowers of each pair sessile; the pedicel of the other one not more than 0.3 mm. long (pedicels of the flowers in the forks of the dichasia somewhat longer).

d. Leaves ovate or ovate-elliptic, less than twice as long as wide, and rarely more than 10 cm. long; on the underside lepidote. Peduncle about as long as the petiole of the preceding leaf. The larger floral bracts about 1 mm. long. — Java and West Sumatra.....1. *Str. tortilis.*

d: Leaves lanceolate- or oblong-elliptic, more than twice as long as wide, and nearly always more than 10 cm. long; not lepidote on the underside. Peduncle much shorter than the petiole of the preceding leaf. The larger floral bracts at least 1.2 mm. long. — Malay Peninsula and Sumatra.....2. *Str. microcarpa.*

c: All flowers distinctly pedicellate; the pedicels about 0.6 mm. long. — South Sumatra.....3. *Str. lampongensis.*

b: Stipules ovate, obovate or oblong in outline; the incision between the two lobes not reaching beyond the centre. Flowers always pedicellate, and the pedicels always more than 0.6 mm. long.

e. Leaves at least 15 cm. long. Stipules oblong or obovate. — Bornean species.

f. Stem glabrous. Leaves slightly pubescent on the midrib beaneath. — West Borneo.....4. *Str. bracteata.*

f: Stem densely rufous-pubescent. Leaves on the underside on midrib, nerves and venules densely pubescent.

g. Petioles 1–2 cm. long; blade 15–26 cm. × 7–13 cm., subobtuse, provided with about 20 pairs of nerves. Midrib of the stipules indistinct. — West Borneo.....5. *Str. myriocarpa.*

g: Petioles 2–8 cm. long; blade 25–30 cm. × 11–12 cm., caudate-acuminate, provided with 11–15 pairs of nerves. Midrib of the stipules prominent and pilose. — North Borneo.....6. *Str. maxima.*

e: Leaves less than 15 cm. long. Stipules ovate or ovate-lanceolate.

h. Stipules provided with a prominulous or prominent midrib. — Bornean species.

i. Leaves on the upper side dotted with bulging resin cells. — North Borneo.....7. *Str. multiglandulosa.*

i: Leaves not dotted with resin cells.

j. Leaves lanceolate, all or at least the majority more than 12 cm. long.

k. Internodes distinctly bicostate. Leaves with about 9 pairs of nerves; on the underside very sparsely pubescent. Stipules ovate, 7–9 mm. wide. — West Borneo.....8. *Str. Johannis-Winkleri.*

k: Internodes ecostate. Leaves with about 12 pairs of nerves; on the underside, especially on the nerves, sparsely villosulous. Stipules ovate-lanceolate, 6 mm. wide. — South-east Borneo.....9. *Str. undulata.*

j: Leaves relatively wider and less than 12 cm. long.

l. Inflorescence twice dichasially ramified. Leaves obtuse or subobtuse and conspicuously bullate. — West Borneo.....10. *Str. bullata.*

l: Inflorescence unbranched. Leaves shortly acuminate, plane. — West Borneo.....11. *Str. bracteolata.*

h: Stipules not provided with a distinct midrib. — Species from the Anambas Islands and Sumatra.

m. Inflorescence with five main branchlets; the lower pair once forked; in the fruiting stage increasing to about twice the original size. — Anambas Islands.....12. *Str. anambasica.*

m: Inflorescence with three branchlets; all branchlets simple; in the fruiting stage not conspicuously larger than before. — Sumatran species.

n. Stipules ovate-lanceolate, divided nearly to the middle. — East Sumatra.....13. *Str. deliensis.*

n: Stipules ovate-orbicular, divided for not more than one-third.
o. Stipules less than 5 mm. wide. None of the petioles more than 2 cm. long. — Mentawei Islands.....14. *Str. hypomalaca.*
o: Stipules more than 10 mm. wide. The lower petioles more than 2 cm. long.
p. Stems and leaves completely glabrous. — Mentawei Islands. .....15. *Str. leiophylla.*
p: Stems and both sides of the leaves villous or hirsute.
q. Leaves on the upper side dotted with bulging and in herbarium material blackened resin cells, and on both sides sparsely villous, provided with 9–10 nerve pairs. Pyrenes black. — West Sumatra.....16. *Str. polyantha.*
q: Leaves not dotted with resin cells, on both sides scabridly hirsute, provided with 12–13 pairs of nerves. Pyrenes red. — East Sumatra.....17. *Str. scabridula.*

a: The undivided part of the stipules of the same width as the stem and less than 2 mm. high. Hairs in the corolla-tube in bundles. Fruits either didymous or globose. — Species from Borneo and the Philippines.

Para-streblosa

r. Stipules costate and the lobes contiguous. Internodes bicostate. — Bornean species.

Costatae

s. Bracts obovate, longer than the flowers. Calyx 1.2 mm. high; lobes ovate-oblong, very unequal in size, imbricate. — East Borneo..... .....18. *Str. chlamydantha.*
s: Bracts ovate, lanceolate or linear, shorter than the flowers. Calyx at the most 0.8 mm. high; lobes ovate or triangular, equal, never overlapping.
t. Peduncle as long as or nearly as long as the preceding leaf. Calyx divided nearly to the base; lobes ovate, 0.6 mm. long. Fruits didymous. — East Borneo.....19. *Str. longiscapa.*
t: Peduncle much shorter than the preceding leaf. Calyx-lobes triangular, not more than 0.4 mm. long. Fruits globose.
u. Leaves linear-lanceolate, lanceolate or lanceolate-oblong; raphides at the underside in herbarium material easily distinguishable. Bracts early deciduous.
v. Leaves linear-lanceolate, 10–16 cm. × 2.0–3.3 cm. Peduncle not more than 4 mm. long. — West Borneo.....20. *Str. lanceolata.*
v: Leaves lanceolate or lanceolate-oblong, 11–16 cm. × 4–6 cm. Peduncle 1.2–1.5 cm. long. — North Borneo.....21. *Str. urticina.*
α. Stem, petioles and, in young leaves, midrib and nerves puberulous; peduncle densely puberulous. — North Borneo.....var. *Stapfii.*
α: All parts glabrous. — North Borneo.....var. *glabrescens.*
u: Leaves elliptic; raphides never easily distinguishable. Bracts subpersistent.
w. Basal part of the stem about 3 mm. thick. Leaves 14–17 cm. × 8–10 cm., with about 10 pairs of nerves. Corolla 3.2 mm. long. — North and East Borneo.....22. *Str. glabra.*
w: Basal part of the stem about 7 mm. thick. Leaves 17–27 cm. × 8.5–12 cm., with about 13 pairs of nerves. Corolla 6 mm. long. — West Borneo.....23. *Str. assimilis.*

r: Stipules ecostate and the lobes separated from each other by a wide gap. Internodes ecostate. — Species from Palawan and the other Philippines.

Ecostatae

x. Internodes without grooves. Stipular lobes linear, 1.5–1.8 mm. long; the gap rectangular. Corolla 3.5 mm. long. — Palawan.....24. *Str. palawanensis.*

β. Leaves in herbarium material olivaceous, on the upper side nitidulous; raphides on the underside here and there visible. — Palawan.....
.....var. *Merrillii*.
β: Leaves in herbarium material brown, on both sides dull; raphides nowhere distinguishable. — Palawan.....var. *Elmeri*.
x: Internodes with two longitudinal grooves. Stipular lobes semi-triangular, 6–7 mm. long and at the base 3 mm. wide; the gap with rounded corners. Corolla 2 mm. long. — Luzon, Catanduanes and ?Samar.....
.....25. *Str. axilliflora*.
γ. Inflorescences even in the fruiting stage not more than 1.5 cm. in diam.
δ. Leaves lanceolate-elliptic, 10–14 cm. × 4.2–5.4 cm. — Luzon.....
.....var. *angustifolia*.
δ: Leaves elliptic, 8 cm. × 5.5 cm. — Luzon.....var. *latifolia*.
γ: Inflorescences in the fruiting stage up to 3.5 cm. in diam. — Catanduanes.
.....var. *laxiflora*.

Subgenus **Eu-streblosa**

Stipulae magnae; pars basalis caule latior. Bracteae cuiusque paris diversa altitudine insertae. Corollae tubus intus annulo completo pilorum instructus. Fructus semper didymus. — Species 1–17, in Peninsula Malayana, Sumatra, Java et terra Borneënsi endemicae.

1. **Streblosa tortilis** (Bl.) Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851, var. β excl.; Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 211. 1869; Val. in Ic. Bog. 4: 139, t. 343. 1912; Koorders-Schuhmacher, Syst. Verz. 1 (1): 105. 1912.
Psychotria tortilis Bl., Bijdr. Fl. Ned. Ind. 958. 1826; Miq., Fl. Ind. Bat. 2: 294. 1857, Suppl. 223. 1860; Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 124, 125. 1873, syn.
Psychotria microcarpa Wall. excl.; Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1891; Koorders, Exkursionsfl. Java 3: 268. 1912. Non Hook. f., Fl. Brit. Ind. 3: 169. 1880; nec King & Gamble in Jour. As. Soc. Beng. 72 (2): 11. 1906; nec Ridl. in Jour. As. Soc. Straits 57: 62. 1911, quae est *Str. microcarpa* Ridl.

Caulis ascendens, 10–20 cm. altus, ad apicem 2–2.5 mm. diam., basi plerumque usque ad 3 mm. incrassatus, primum pilis rufis puberulo-pubescens, deinde glabrescens, internodiis primum bisulcatis, deinde teres, cortice rubro-striatulo vestitus, basin versus lignescens et ibi libero crassiore rubro-striatulo munitus; pars decumbens radicans. Folia petiolo supra glabro et subtus puberulo-pubescente, plerumque conspicue rubro-striatulo, 1–3.5 cm. longo instructa; lamina ovata vel ovato-elliptica, 3.5–11 cm. longa et 2.5–7.2 cm. lata, apice acuta vel subacuta, basin versus rotundata, prope petiolum tamen subito contracta, opaca, supra primum dense scabridula, mox glabrescente et plerumque cellulis resiniferis rubris, sicc. nigrescentibus dense punctata, sicc. saturate brunnea vel badia, subtus costa nervis venulis primum pilis rufis dense puberulo-pubescens, deinde parcius substrigosa, inter venulas albido-lepidota, sicc. dilute brunnea vel albida, raphidibus distincte lineolata, costa subtus plerumque distincte rubro-striatula, mesophyllo plerumque cellulis resiniferis marmorato, nervis utroque latere costae 8 vel 9 utrimque prominulis, venulis utrimque distinguendis. Stipulae e basi ovata, 5–8 mm. lata in lobos duos angustos et acutissime exeuntes, plus minusve divergentes, 3–5 mm. longos contractae, ad basin pubescentes et margine fugaciter ciliolatae, ceterum glabrae. Inflorescentiae pedunculo erecto, petiolo folii praecedentis subaequilongo, gracili, pubescente instructae; ramuli 5 subumbellati,

primum breves, post anthesin usque ad 3 cm. elongati, plerumque semel dichasiales, pubescentes. Bracteae ramulorum triangulares, 3–5 mm. longae, rubro-striatulae, margine ciliatae, subliberae; bracteae florales inaequales, cuiusque paris inferior late ovata, 1 mm. longa, superior angustior, 0.8 mm. longa, ceterum ut bracteae ramulorum. Flores furcis dichasiorum inserti pedicello 0.6 mm. longo instructi; aliorum pedicelli 0.1 mm. longi; florum pares stipite 0.2–0.3 mm. longo elati. Calyx 1 mm. altus, lobis ovato-triangularibus tubo duplo longioribus, rubro-striatulis. Corolla 3.7 mm. longa, tubo dimidio superiore subcampanulato. Fructus rubro-maculatus, primum pubescens, deinde glabrescens; pyrenae rubro-brunneae.

Habitat silvas Javae praesertim partis occidentalis et Sumatrae Occidentalis.

JAVA: Bantam Res.: Nando Badak, *Blume s.n.* (L), f. longistyla, et G. Seribu, *Blume 893* (L), f. brevistyla (in eodem folio fixae), TYPI, dupl. U. Buitenzorg Res.: G. Djambu near Lewidang, alt. 250 m., *Bakhuizen v. d. Brink 5248* (BZ, L); ibidem, *Bakhuizen v. d. Brink Jr. 855* (U); G. Tjibodas near Tjampea, alt. 200 m., *Hallier 461* (BZ, L); G. Burung (G. Bunder)., alt. 200–300 m., *Schiffner 2709* (L); Pasir Ipis near G. Parungpung, alt. 750 m., *Bakhuizen v. d. Brink 7293* (BZ, L).

SUMATRA: Galangankwo near Ginteng, *Korthals s.n.* (L): leaves somewhat smaller than in the type (5.5–7 cm. × 3–4.3 cm.), but otherwise apparently not different.

The exact locality of the plant collected by Korthals in Sumatra, is unknown to me: that quoted above, is the one given by Korthals in his paper in Ned. Kruidk. Arch. 2 (2): 246, but a label attached to the specimen in the Leiden herbarium and written by Korthals himself, is inscribed: P. Genting.

A specimen collected by Koorders in Banjumas (Central Java), has leaves which are much larger than those of the type (up to 14.5 cm. × 9 cm.), and are not dotted with resin cells, but are like those of the type provided with 8 or 9 pairs of nerves. The position of this specimen is somewhat uncertain: provisionally I refer it to the species described above, but more material from the same region will have to be investigated before a definite conclusion can be drawn. Koorders-Schuhmacher l.c. quotes a specimen (*Koorders 23565* BZ) collected in the Malang Residency at Sumber Tangkil. It remains to be seen whether this really is conspecific.

In some of the specimens, e.g. in *Blume 893*, anomalous inflorescences are seen in which the branchlets are replaced by somewhat impoverished, but otherwise normal inflorescences.

The roots on the decumbent part of the stem are not confined to the nodes, but spread over the whole length of the internodes. *Schiffner 2709* shows young plants springing from the decumbent part: one of them is already rooting at the base.

Streblosa tortilis comes very near to *Str. microcarpa*, with which it was confused by Hooker ll.cc. In the shape of the stipules and in the structure of the inflorescence with its five forked branchlets and subsessile flowers and in the usually conspicuously dotted upper side of the leaves there is a close resemblance, but *Str. tortilis* is a much smaller plant, the stem

rarely exceeding 20 cm. in height and the leaves rarely 10 cm. in length; the leaves, moreover, are ovate or ovate-elliptic and acute or subacute instead of elliptic and more or less distinctly acuminate, and they are lepidote on the lower side, and the peduncle is erect and about as long as the petiole of the leaf at its base, instead of much shorter and recurved. With *Str. lampongensis* too it shows an unmistakable affinity, for instance in the shape of the stipules and in the development of a rather thick secondary bast streaked with red resin cells in the basal part of the stem, but this species has distinctly pedicellate flowers and its leaves are not dotted with resin cells on the upper side. Groups of resin cells in the secondary bast are not confined to these three species, but are found also in *Str. myriocarpa* and in *Str. maxima*, and perhaps in the related species *Str. bracteata* and *Str. multiglandulosa*, but of these I had no material at my disposition, and the original descriptions make no mention of this character. An epidermis dotted with resin cells on the upper side of the leaves, is a much less common feature than the presence of resin cells in the cortex and in the secondary bast. In this respect *Str. tortilis* is matched only by *Str. microcarpa* and probably by *Str. multiglandulosa*, and further by the but distantly related *Str. polyantha*. These resin cells are not always easily distinguishable, probably because the production of resin varies according to circumstances, and as the cells, in which the resin is deposited, are in shape and size indistinguishable from the ordinary epidermis cells, it is easily conceivable that they are not always conspicuous.

2. **Streblosa microcarpa** Ridl., Fl. Mal. Pen. 2: 148. 1923. Non Ridl. in Kew Bull. 1926: 70. 1926, quae est *Str. leiophylla* Brem.

Streblosa Wallichii Merr. in Papers Mich. Acad. Sci. 23: 194. 1938, n. nom. illeg. *Psychotria tortilis* Bl. in errore apud Hook. f., Fl. Brit. Ind. 3: 169. 1880; King & Gamble in Jour. As. Soc. Beng. 72 (2): 11. 1906; Ridl. in Jour. As. Soc. Straits 57: 62. 1911.

Streblosa puberula Merr. in Papers Mich. Acad. Sci. 23: 195. 1938.

Caulis ascendens, 20–60 cm. altus, ad apicem 1.5–2 mm. diam., basi usque ad 5 mm. accrescens, internodiis primum bisulcatis, deinde teres, cortice rubro-striatulo vestitus, basin versus lignescens et ibi libero crassiore rubro-striatulo munitus. Folia petiolo supra glabro, subtus primum densius, deinde sparsius puberulo-pubescente, 1.5–5 cm. longo instructa; lamina elliptica, 10–23 cm. longa et 4.5–9.5 cm. lata, apice acuta vel acuminata, basi contracta, supra nitidula, primum minute scabridulo-papillosa, deinde glabrescens, plerumque cellulis resiniferis rubris, sicc. nigrescentibus dense punctata, sicc. olivaceo-brunnea, subtus praesertim costa nervis venulis primum pilis rufis dense puberulo-pubescens, deinde sparsius pubescens et inter venulas glabrescens, haud lepidota, sicc. pallide viridis vel interdum dilute rubro-brunnea, raphidibus inconspicuis, nervis utroque latere costae 10–15, venulis utrimque distinguendis. Stipulae e basi ovata 4–6 mm. lata in lobos duos angustos et acutissime exeuntes, plus minusve divergentes, 3.5–7 mm. longos contractae, margine scabridulae, ceterum glabrae. Inflorescentiae pedunculo recurvato, puberulo-pubescente, 4–5 mm. vel raro usque ad 10 mm. longo instructae; ramuli 5 subumbellati, primum breves, post anthesin usque ad 1.5 cm. elongati,

pubescentes, infimi iterum ramulis duobus lateralibus instructi, alii semel dichasiales. Bracteae ramulorum triangulares, 3–5 mm. longae, rubro-striatulae, margine ciliatae, basi late connatae; bracteae florales inaequales, cuiusque paris inferior 1.5–2.5 mm., superior 1.2–1.7 mm. longa, ceterum ut bracteae ramulorum. Flores furcis dichasiorum inserti distincte pedicellati, alii subsessiles; florum pares stipite 0.1–0.3 mm. longo elati. Calyx 0.7–1 mm. altus, lobis ovato-orbicularibus tubo fere duplo longioribus, rubro-striatulis. Corolla 2.4–3 mm. longa, tubo dimidio superiore subcampanulato. Fructus plerumque rubro-maculatus, primum pubescens, deinde glabrescens; pyrenae rubrae vel nigrescentes.

Habitat Peninsulam Malayanam et Sumatram.

Malay Peninsula. Penang, *Wallich* Herb. no. *8344*, typus (exemplum vidi in Herb. Gray.); Perak (cf. Ridl. ll.cc.).

Sumatra. Djambi Res.: S. Mengopih, *Rutten-Kooistra* 3 (U) "very common." East Coast Govt.: Asahan, Silo Maradja, alt. 40–60 m., *Bartlett 8686* (NY). H. Bagasan, *Rahmat 6429* et *6543* (AA). Tapianuli Res.: Padang si Dimpuan, alt. 30–250 m., H. Imbaru, *Rahmat 4636* (NY); Aek Roppak, *Rahmat 4675*, *4775* (NY); Si Harehare Djae, *Rahmat 5000* (NY, type of *Str. puberula* Merr., AA); Sopsopan an Aek si Olip, *Rahmat 5101* (NY). Govt. Atjeh and Dependencies: Country of the Gajo, between Aer Panas and Reoma Bundar, near milestone 66/67, alt. 1000 m., *v. Steenis 10070* (BZ). West Coast Res.: G. Malintang, N.W. slope, alt. 1150 m., *Bünnemeyer 3529* (BZ).

The specimens collected by *Bünnemeyer* on the G. Malintang in West Sumatra, differ from the type in the absence of the dots caused by the resin cells in the epidermis of the leaves, the slightly longer peduncles (up to 10 mm. long), the nearly estipitate flower-pairs, the slightly larger size of the flowers and the nearly black pyrenes. The material is, owing to the development of mould during the process of drying, in a very bad condition.

King & Gamble l.c., cite under their *Psychotria tortilis* a specimen collected in South Sumatra by *Forbes* (*1495*), which I have not seen, and whose position, therefore, remains uncertain: it may have belonged to the real *Streblosa tortilis* or to *Str. lampongensis*.

Merrill, l.c., rejected Ridley's name for this species because the specific epithet was adopted from *Psychotria microcarpa* Wall., which he regards as an illegitimate name because there exists an earlier homonym. In reality, however, it is a manuscript name, which means that it is to be regarded as non-existent. As the plant, therefore, had no legitimate name, Ridley was free to choose whatever name he wished.

The differences between *Str. microcarpa* and *Str. tortilis* have been given above. In general aspect it is perhaps more like *Str. lampongensis*, which it resembles in height and in the shape and size of the leaves, but from which it is easily distinguishable by the subsessile flowers.

3. **Streblosa lampongensis** Brem. n. spec.; typus: *Ibut 29* (L).

Caulis probabiliter circ. 40 cm. altus, sed pars basalis speciminum investigatorum non conservata et habitus inde non bene notus; interdum pseudo-dichotome furcatus; ad apicem 1.5 mm. diam., basi usque ad 5 mm. incrassatus, internodiis primum bisulcatis, sicc. longitudinaliter

rugosis, deinde teres, cortice fusco, rubro-striatulo vestitus, basin versus lignescens et ibi libero crassiore sed haud rubro-striatulo munitus. Folia petiolo subtus primum pilis rubris puberulo, mox glabrescente, 1.5–5 cm. longo instructa; lamina foliorum superiorum ovato-elliptica, 10–16 cm. longa et 5.5–9.5 cm. lata, apice acuta vel subacuminata, basi rotundata sed prope petiolum subito contracta, foliorum inferiorum lanceolato-oblonga, 13–15 cm. longa et 5–5.5 cm. lata, apice basique attenuata, omnium supra nitidula vel opaca, sicc. supra saturate et subtus dilute rubro-brunnea, primum subtus costa nervisque pilis rubris crispatis dense puberulo-pubescens, deinde plus minusve glabrescens, haud lepidota, raphidibus inconspicuis, nervis utroque latere costae 11–14, venulis utrimque distinguendis. Stipulae e basi ovata, 5–6 mm. lata in lobos duos angustos et acutissime exeuntes, plus minusve divergentes, 4 mm. longos contractae. Inflorescentiae pedunculo recurvato, sparse hirtello, 5–8 mm. longo instructae; ramuli 5 subumbellati, infimi iterum ramulis duobus lateralibus instructi et postea ut ramuli alii semel dichasiales, sparse hirtelli, primum breves, post anthesin usque ad 2 cm. elongati. Bracteae ramulorum triangulares, uno latere lobo stipulari triangulari instructae, 4–5 mm. longae, costa carinatae, subglabrae; bracteae florales ovatae, inaequales, cuiusque paris inferior 1.5 mm. longa, superior minor, hirtellae. Florum pares stipite sparse hirtello 0.6 mm. longo elati; flores pedicellati; pedicelli sparse hirtelli, 0.5–0.6 mm. longi. Calyx 0.7 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 2.2 mm. longa, tubo dimidio superiore subcampanulato. Fructus subglaber; pyrenae rubrae.

Habitat Sumatram Australem.

SUMATRA. Lampong Districts: slope of G. Rate Telanggaran, alt. 400 m., *Ibut 29* (L, TYPUS), (U, dupl. typi).

It is not impossible that *Forbes 1495*, which was collected in the same region, will prove to belong to this species. As stated above, it was referred by King & Gamble to their *Psychotria tortilis*.

A noteworthy feature of the specimens described above is that they are partly pseudo-dichotomously forked. This means that in this species occasionally both the axillary buds at the base of the peduncle develop into a shoot. The same phenomenon has been observed in *Str. chlamydantha* and in *Str. longiscapa*.

Streblosa lampongensis resembles the two preceding species in the shape of the stipules, the thick layer of secondary bast and the five main branchlets of the inflorescence, but it differs conspicuously from them in its distinctly pedicellate flowers. In this respect it resembles the following species, in which the pedicels, however, are much longer and the bracts much larger, and whose stipules are provided with a larger undivided part and shorter, not diverging lobes.

4. **Streblosa bracteata** Ridl. in Jour. As. Soc. Straits 57: 64. 1911.

Caulis plus quam 45 cm. altus, glaber, basin versus lignescens et ibi usque ad 6 mm. incrassatus. Folia petiolo 2.5–3.2 cm. longo instructa; lamina ovato-lanceolata, 15–17.5 cm. longa et circ. 10 cm. lata, apice subacuta, basi contracta, supra glabra, subtus costa pilis crispatis parce pubescens, nervis utroque latere costae 20. Stipulae magnae ambitu oblongae, bifidae, lobis acuminatis 12 mm. longis, glabrae. Inflorescentiae

the underside ferrugineous-puberulous leaves with their more numerous nerves and denser reticulation, and the larger size of the bracts subtending the branchlets of the inflorescence.

6. **Streblosa maxima** Brem. n. spec.; TYPUS: *Amdjah*, Exped. *v. Genderen Stort 283* (BZ).

Caulis circ. 50 cm. altus; pars basalis speciminum investigatorum non conservata et habitus inde non bene notus; ad apicem 4 mm. diam., basi usque ad 9 mm. incrassatus, primum pilis rufis crispatis dense pubescens, internodiis primum complanatis et bisulcatis, deinde teres, basin versus lignescens et ibi libero crassiore dense rubro-striatulo vestitus. Folia petiolo subtus pilis rufis primum dense, deinde sparsius puberulo-pubescente, 2–8 cm. longo instructa; lamina elliptica, 25–30 cm. longa et 11–12 cm. lata, apice caudato-acuminata, basi contracta, supra nitidula, sicc. supra saturate et subtus dilute rubro-brunnea, supra glaberrima, subtus primum ubique pilis rufis densius puberulo-pubescens, deinde costa nervis venulis satis dense, ceterum sparse puberula, lepidota, raphidibus inconspicuis, nervis utroque latere costae 11–15, nervis venulisque subtus prominulis. Stipulae ambitu obovatae, 2.7 cm. longae et 2.2 cm. latae, bifidae, lobis late et oblique triangularibus 1.2 cm. longis, margine ciliatae, costa pilis rufis dense, ceterum sparsissime puberulo-pubescentes, sicc. saturate rubro-brunneae. Inflorescentiae pedunculo recurvato, puberulo, circ. 10 mm. longo instructae; ramuli 5 subumbellati, infimi semel dichasiales, omnes pilis rufis puberulo-hirtelli, primum circ. 1.1 cm., deinde usque ad 2 cm. longi. Bracteae ramulorum triangulares, infimae 8 mm. longae, carinatae; bracteae florales inaequales, cuiusque paris inferior 2–2.5 mm. longa, superior dimidio brevior. Florum pares stipite 2 mm. longo, hirtello instructi. Flores pedicellati. Pedicelli cuiusque paris paulum inaequales, 2.5 vel 3 mm. longi. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 3.5 mm. longa, tubo tereti. Fructus pilis rufis puberulo-hirtellus; pyrenae rubro-brunneae.

Habitat terrae Borneënsis partem septentrionalem.

BORNEO. Southern and Eastern Division: Tidung, G. Labang, *Amdjah*, Exped. *v. Genderen Stort 283* (BZ), TYPUS.

Streblosa maxima and *Str. myriocarpa* are very similar: both are provided with stout, densely pubescent shoots, large, on the upper side completely glabrous and on the underside, especially on the midrib and on the network of the nerves and venules, densely puberulous-pubescent leaves, large, slightly puberulous-pubescent stipules and many-flowered inflorescences with five main branchlets and pedicellate flowers. *Streblosa bracteata* is apparently a less robust plant provided with a less conspicuous indumentum, but with leaves and stipules of a similar shape and size. *Streblosa maxima* differs from *Str. myriocarpa* in the greater length of the petioles, the larger, caudate-acuminate leaves with their smaller number of nerves and more lax reticulation, the reddish brown colour of the indumentum, the inconspicuousness of the raphides, and the smaller size of the bracts at the base of the branchlets.

7. **Streblosa multiglandulosa** Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929.

Caulis circ. 30 cm. altus, primum pilis rubro-brunneis crispatulis dense

villosus, deinde glabrescens, usque ad 5 mm. diam. accrescens. Folia petiolo 1–1.5 cm. longo, dense crispatulo-villoso instructa; lamina oblongo-ovata vel oblongo-obovata, 9–14 cm. longa et 4–6 cm. lata, apice acuminata, basi cuneata, subcoriacea, supra sicc. olivacea, glabra, cellulis resiniferis rubris vel brunneis punctata, subtus praesertim costa nervisque pilis rubro-brunneis vel ferrugineis conspicue crispatulo-villosa, nervis utroque latere costae circ. 13, venulis subtus prominulis. Stipulae ambitu ovatae, bifidae, 1–1.4 cm. longae. Inflorescentiae subsessiles, multiflorae, densae; ramuli circ. 1 cm. longi. Bracteae florales lineari-lanceolatae, 8–12 mm. longae et 1–1.5 mm. latae, acuminatae, rubro-striatulae, pilis rubro-brunneis pubescentes. Flores pedicellati; pedicelli 1–4 mm. longi. Fructus rubro-striatulus, plus minusve ferrugineo-villosus.

Habitat terrae Borneënsis partem septentrionalem.

Borneo. British North Borneo, near Tawao, *Elmer 21909*, typus, n.v.

The position of this species is difficult to determine. The presence of resin cells not only in the mesophyll of the bracts and in the mesocarp but also in the epidermis on the upper side of the leaves is a diagnostic character of great importance, but as these cells are found in such distantly related species as *Str. tortilis* and *Str. polyantha,* the taxonomic value of this character is small. Of more importance are the ovate stipules, the long floral bracts and the pedicellate flowers, for on account of these characters it is to be assigned a place between or next to the species 9–18, of which the first four occur, like *Str. multiglandulosa,* in Borneo and the remaining ones in the Anambas Islands and in Sumatra. The presence of curled hairs on the stem and on the underside of the leaves suggest a nearer affinity with the Bornean *Str. bullata* and *Str. bracteolata.* On account of this presumed affinity it has been assumed in the key that it belongs to the same group of Bornean species as the latter (species 8–11), and that its stipules are, like those of the other species of this group, provided with a prominent midrib. It differs from the species 8–11 in the presence of resin cells in the epidermis on the upper side of the leaves. In this respect it resembles the Sumatran *Str. polyantha,* from which it is easily distinguishable by the entirely glabrous upper side of the leaves. In the "rather rigid" leaves it resembles *Str. bracteolata.*

8. **Streblosa Johannis-Winkleri** Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1927.

Caulis usque ad 60 cm. altus, erectus, ultimo tamen prostratus et ex axillis innovationes emittens, ad apicem 1.2 mm. diam. et pilis paucis sparsus, mox glabrescens tamen et basi usque ad 3 mm. diam. incrassatus, internodiis leviter bicostatis, primum vix conspicue complanatis sed haud sulcatis, basi lignescente cortice fusco et libero crassiore sed haud distincte striatulo vestitus. Folia petiolo subtus primum pilis rufis dense vestito, deinde glabrescente, 1.5–2.5 cm. longo instructa; lamina lanceolata, 12–14 cm. longa et 4.2–5 cm. lata, utroque extremo contracta, opaca, supra sicc. nigro-brunnea, subtus dilute brunnea, supra glabra, subtus ubique pilis rufis sparsa, lepidota, raphidibus minime in foliis novellis distinguendis, nervis utroque latere costae 8–10, venulis subtus prominulis. Stipulae ambitu ovatae, 10–15 mm. longae et 7–9 mm. latae, acuminatae, bifidae, lobis 5 mm. longis, contiguis, margine et costa prominente ciliatae, ceterum

glabrae. Inflorescentiae pedunculo recurvato, sparse hirtello, 4 mm. longo instructae; ramuli 5 subumbellati, simplices, primum circ. 0.5 cm., deinde usque ad 1 cm. longi, sparse hirtelli. Bracteae ramulorum linearilanceolatae, 7 mm. longae et 1.5 mm. latae, subglabrae; bracteae florales margine ciliatae, inaequales, cuiusque paris inferior linearis, 3–4.5 mm. longa et 0.3–0.4 mm. lata, superior lineari-lanceolata, 1.2 mm. longa et 0.3–0.4 mm. lata, 0.5 mm. in pedicellum egrediens. Florum pares stipite 0.5 mm. longo instructi. Flores pedicellati; pedicelli 2.5 mm. longi, parce hirtelli. Calyx 0.7 mm. altus, lobis ovato-triangularibus tubo subaequilongis. Corolla 3 mm. longa, tubo tereti. Fructus parce hirtellus; pyrenae rubrae.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO: Western Division: Schwaner Mts., Bukit Mulu, alt. 450 m., *Winkler 441* (HBG, TYPUS); Lebang Hara, alt. 150–180 m., *Winkler 352*, *356* (HBG), n.v.

The stipules of this species are not only like those of *Str. maxima*, *Str. bullata* and *Str. bracteolata*, provided with a distinct midrib, but its internodes, moreover, are distinctly bicostate, the midribs of the stipules decurring to the preceding node, whereas the shoots of the other species are ecostate. Bicostate internodes, however, are a constant feature of the Bornean representatives of the subgenus *Para-streblosa*. Among the species belonging to the subgenus *Eu-streblosa*, to which *Str. Johannis-Winkleri*, on account of the ovate stipules, unequal floral bracts and the complete ring of hairs in the corolla-tube doubtless belongs, it comes nearest to *Str. undulata*, *Str. bullata* and *Str. bracteolata*, which it resembles in the shape and size of the stipules and in the nature of the indumentum. From *Str. bullata* and *Str. bracteolata* it differs conspicuously in the narrow leaves, and from *Str. undulata* in the smaller number of nerves; from all three moreover in the bicostate internodes.

9. **Streblosa undulata** Khs. interpr. Val. in Engl., Bot. Jahrb. 44: 568. 1910; an Khs. in Ned. Kruidk. Arch. II, 2: 247. 1851=*Psychotria undulata* (Khs.) Miq., Fl. Ind. Bat. 2: 291. 1857 et Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1891, incertum.

Caulis 50 cm. altus, ad apicem fuliginoso-villosus, basin versus lignescens. Folia petiolata; lamina lanceolata, 9–15 cm. longa et 3.5–5 cm. lata, apice sensim acuminata vel attenuata, basi attenuata, margine saepe leviter undulata, supra glabra, sicc. fusca vel olivacea, subtus ubique sed imprimis ad nervos sparse fuliginoso-villosula, sicc. pallide olivacea, nervis utroque latere costae circ. 12, subtus prominulis et colore fusco conspicuis. Stipulae late ovato-lanceolatae, bifidae, lobis acuminatis villosulis, 12 mm. longae et basi 6 mm. latae. Inflorescentiae subsessiles, densiflorae. Bracteae florales lineares, floribus aequilongae, crassiusculae, pilosae. Flores pedicellati. Pedicelli floribus aequilongi, 2–4 mm. longi. Fructus hirtellus.

Habitat terrae Borneënsis partem austro-orientalem.

BORNEO: Southern and Eastern Division: Hayup, *H. Winkler 2583*, typus descriptionis, n.v.; between Batu Babi and Lumowia, *H. Winkler 2826*, *2861*, n.v.

The description given above has been based on that of Valeton, but whether the specimens investigated by the latter really are conspecific

with those collected by Korthals on Mt. Sakumbang, seems dubious, for Korthals described the leaves as elliptic and hirsute on the nerves beneath, the stipules as ovate and the bracts as oblong, whereas the leaves of Winkler's specimens are, according to Valeton's description, lanceolate and sparsely villosulous on the nerves beneath, the stipules ovate-lanceolate and the bracts linear. It is quite possible that in the future, when the flora of the south-eastern part of Borneo becomes better known, a species may be found which fits Korthals' description better than that described by Valeton. In my opinion it would have been better if Valeton had described Winkler's specimens under a new name: in the absence of the type-specimen, Korthals' species doubtless can not be regarded as sufficiently recognizable. Provisionally, however, I have accepted Valeton's interpretation.

The species described above apparently comes near to *Str. Johannis-Winkleri,* from which it differs in a somewhat more conspicuous indumentum, a larger number of nerves in the leaves, narrower stipules, and probably also by the absence of the ribs on the internodes: the latter, at any rate, are not mentioned in Valeton's description.

10. **Streblosa bullata** Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 296. 1937.

Caulis ascendens, circ. 15 cm. altus, ad apicem 1.5 mm. diam., basi usque ad 2.5 mm. incrassatus, primum pilis rufis dense pubescens, deinde plus minusve glabrescens, internodiis haud distincte sulcatis, basi libero crassiore sed haud distincte striatulo vestitus; pars decumbens radicans. Folia petiolo subtus pilis rufis primum dense, deinde sparse pubescente, 0.5–1.5 cm. longo instructa; lamina elliptica, elliptico-oblonga vel elliptico-ovata, 4.5–7.5 cm. longa et 2.7–6.2 cm. lata, apice subobtusa vel obtusa, basi ad petiolum subito contracta, opaca, sicc. supra olivacea, ad costam nervos venulos tamen pallida, subtus dilute olivacea, costa nervisque brunneis, inter nervos et venulos conspicue bullata, supra glabra, subtus costa nervis venulis a pilis primum rubro-brunneis, deinde ferrugineis dense pubescens, lepidota, raphidibus inconspicuis, nervis utroque latere costae 8–10, venulis subtus prominulis. Stipulae ambitu ovatae, 7.5–8.5 mm. longae et 8–10 mm. latae, bilobae, lobis 2.5 mm. longis, contiguis, margine ciliatae, costa densius puberulo-pubescentes, ceterum glabrae. Inflorescentiae pedunculo recurvato, sparse pubescente, 5 mm. longo instructae; bis dichasiales, 2 cm. diam. Bracteae infimae lanceolatae, 12.5 mm. longae et 4.5 mm. latae, margine ciliatae; bracteae florales lineares, margine et costa ciliatae, inaequales, cuiusque paris inferior circ. 8 mm. longa et 2 mm. lata, superior circ. 5 mm. longa et 0.8 mm. lata, in pedicellum usque ad 0.5 mm. egrediens. Flores pedicellati; pedicelli sparse hirtelli, florum in furcis dichasiorum insertorum circ. 7 mm. longi, aliorum circ. 3 mm. longi; florum pares stipite 1 mm. longo elati. Calyx 1.4 mm. altus, lobis ovato-triangularibus tubo subaequilongis. Corolla 5.5 mm. longa, tubo tereti. Fructus sparse hirtellus; pyrenae luteolae.

Habitat terrae Borneënsis partem austro-occidentalem.

Borneo. Western Division: Upper Kapuas Mts., Nanga Era, alt. 150 m., *Winkler 1560* (HBG, typus).

This species is easily distinguishable by its conspicuously bullate leaves.

Its most important character, however, is the twice dichasially branched inflorescence. In this respect it comes nearest to *Str. bracteolata,* for in both species the inflorescences are entirely cymous, whereas elsewhere the main axis bears a number of racemosely arranged branchlets. In the length of the bracts and in the comparatively large size of the flowers too, these two species resemble each other. In the nature of the stipules and in the hairiness of the nerves and venules on the underside of the leaves they resemble the other Bornean species of the subgenus *Eu-streblosa.*

11. **Streblosa bracteolata** Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 295. 1937.

Caulis ascendens, circ. 30 cm. altus, ad apicem 1.6 mm. diam., basi usque ad 3 mm. incrassatus, primum pilis fuscis dense pubescens, deinde plus minusve glabrescens, internodiis primum plus minusve complanatis sed vix sulcatis, basi libero crassiore, haud distincte striatulo vestitus; pars decumbens radicans. Folia petiolo subtus dense pubescente, 1–2 cm. longo instructa; lamina obovata vel elliptico-obovata, 6–9.5 cm. longa et 3.8–5 cm. lata, apice breviter acuminata, basi contracta, pro genere rigidior, opaca, sicc. supra olivacea, subtus dilute brunnea, supra glabra, subtus pilis fuscis ubique sed costa nervis venulis densius pubescens, lepidota, raphidibus inconspicuis, nervis utroque latere costae 8 vel 9, venulis subtus prominulis. Stipulae ambitu late ovatae, 9.5 mm. longae et 12 mm. latae, bilobae, lobis 2.5 mm. longis, margine ciliatae, costa pubescentes sed ceterum glabrae. Inflorescentiae pedunculo recurvato, pubescente, 3 mm. longo instructae; simplices. Bracteae florales infimae subaequales, lanceolatae, 12 mm. longae et 4 mm. latae, margine ciliatae; aliae lineares, extus sparse hirtellae, margine ciliatae, inaequales, cuiusque paris inferior 10 mm. longa et 1.7 mm. lata, superior 6 mm. longa et 0.9 mm. lata. Florum pares stipite 1 mm. longo elati. Flores pedicellati; pedicelli subglabri, circ. 3 mm. longi. Calyx 2 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 8 mm. longa, tubo tereti. Fructus sparse hirtellus; pyrenae rubro-brunneae.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO. Western Division: Schwaner Mts., Bukit Mulu, alt. 300 m., *Winkler 1198* (HBG, TYPUS); Bidang Menabei, *Winkler 831* (HBG).

As stated above, this species comes nearest to *Str. bullata,* from which it is, however, easily distinguishable: its leaves are plane, the inflorescences unbranched, the bracts longer and the flowers larger. The relations of these two species with *Str. Johannis-Winkleri* and *Str. undulata* have been discussed already in the note at the end of the description of *Str. Johannis-Winkleri.*

Merrill, l.c., compares this species with *Str. pubescens* Ridl., of which I have seen no material, but whose position in the genus *Streblosa* seems to me very dubious. Its stipules are said to be lanceolate-acuminate, which would mean that they are entire, its stamens should be inserted at the base of the corolla-tube, and both the stamens and the style should be included. It is possible that my objections against its position are based on inaccuracies in the description, and that it is in reality a true *Streblosa.* On account of its subsessile flowers, it is, at any rate, not probable that it would belong to the nearest allies of the species described above.

12. **Streblosa anambasica** Brem. n. spec.; TYPUS: *v. Steenis 703* (L).

Caulis ascendens, circ. 40 cm. altus, ad apicem 1.5 mm. diam., basi usque ad 4 mm. incrassatus, primum pilis paucis sparsus, mox totus glabrescens, internodiis primum bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo marginibus primum parce ciliato, 1–3.5 cm. longo instructa; lamina lanceolata, 11–14 cm. longa et 4.2–4.8 cm. lata, apice acuta vel subacuminata, basi cuneata vel subcontracta, opaca, sicc. supra saturate et subtus dilute brunnea, utrimque glabra, subtus lepidota, raphidibus inconspicuis, nervis utroque latere costae 9 vel 10, venulis sicc. colore saturatiore subtus conspicuis sed vix prominulis. Stipulae ambitu ovatae, 7 mm. altae et 6 mm. latae, acutae, bifidae, lobis contiguis 3 mm. longis, ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, primum pilis rufis puberulo-pubescente, deinde glabrescente, circ. 5 mm. longo instructae; ramuli 5 subumbellati, primum pubescentes, deinde glabrescentes, primum circ. 7 mm., deinde usque ad 13 mm. longi, infimi semel dichasiales. Bracteae ramulorum lineari-lanceolatae, primum subtus parce pubescentes, deinde glabrescentes, deciduae, infimae usque ad 9 mm. longae; bracteae florales lineares, paulum inaequales, cuiusque paris inferior 4–5 mm., superior 3–3.5 mm. longa, praesertim margine plus minusve distincte hirtello-pubescentes. Florum pares stipite 1 mm. longo instructi. Flores pedicellati; pedicelli circ. 1.5 mm. longi, parce hirtello-pubescentes. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 1.5 mm. longa, tubo tereti. Fructus hirtellus; pyrenae luteolae.

Habitat Archipelagum Anambasicum.

ANAMBAS ISLANDS: Siantan: east of Terampa, alt. 200 m., *v. Steenis 703* (L, TYPUS).

This species occupies a rather isolated position in the genus. By the shortness of the pedicels it resembles *Str. lampongensis,* from which it differs, however, conspicuously in the shape of the stipules and in the thinness of the secondary bast. In the shape of the stipules it resembles the Bornean species 8–11 and the Sumatran species 13–17, especially the latter, for from the Bornean species it differs by the inevidence of the midrib. The Sumatran species it resembles also in the thinness of the secondary bast, but it differs from them in the larger number of branchlets in the inflorescence.

Habitually *Str. anambasica* is easily distinguishable from the other species of the subgenus *Eu-streblosa* by its glabrous leaves. The only other species with entirely glabrous leaves is *Str. leiophylla,* a plant from the Mentawei Islands, which is provided with much smaller, more compact inflorescences with three simple branchlets, larger stipules with shorter lobes, and nitidulous, in dried material olivaceous leaves.

13. **Streblosa deliensis** Brem. n. spec.; TYPUS: *Loerzing 4660* (L).

Caulis ascendens, circ. 30 cm. altus, ad apicem 1.8 mm. diam., basi usque ad 3.5 cm. incrassatus, glaber, parte novella sicc. nigrescente, internodiis primum bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo glabro, 2–5 cm. longo instructa; lamina lanceolato-oblonga vel lanceolato-elliptica, 12–15 cm. longa et

4–6.5 cm. lata, apice acuminata vel attenuata, basi cuneata vel contracta, opaca, sicc. supra saturate olivacea, subtus dilute olivaceo-brunnea, subtus costa nervisque primum puberulo-pubescens, mox ubique glabrescens, vix conspicue lepidota, raphidibus inconspicuis, nervis utroque latere costae 9–11, venulis subtus prominulis. Stipulae ambitu ovato-lanceolatae, 10 mm. altae et 7 mm. latae, acutae, bifidae, lobis contiguis 5 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, 3 mm. longo instructae; ramuli 3, simplices, 9–10 mm. longi, post anthesin vix elongati. Bracteae ramulorum ovatae, 5 mm. longae et 3 mm. latae, ciliolatae; bracteae florales lineares, inaequales, cuiusque paris inferior 5 mm. longa et 1 mm. lata, superior 2.5 mm. longa et 0.5 mm. lata. Florum pares stipite 1–1.5 mm. longo instructi. Flores pedicellati; pedicelli glabri, circ. 3 mm. longi. Calyx 0.7 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 1.9 mm. longa, tubo tereti. Fructus puberulus; pyrenae rubrae.

Habitat Sumatram Occidentalem.

SUMATRA. East Coast Govt.: Deli, Sibolangit, on the grounds of the Botanic Garden, alt. 450 m., *Loerzing 4660* (L, TYPUS).

Streblosa deliensis, Str. hypomalaca, Str. leiophylla, Str. polyantha and *Str. scabridula* resemble each other in the thinness of the secondary bast in the basal part of the stem, the ecostate stipules, and the very shortly pedunculate inflorescences with their three simple branchlets, which do not markedly elongate when the fruits ripen. They are all five endemic in Sumatra and the neighbouring Mentawei Islands. *Streblosa deliensis* differs from the four others in the narrower, bifid, not bilobate, stipules and in the ovate shape of the bracts at the base of the inflorescence. It is a nearly glabrous plant, and in this respect it comes nearest to *Str. leiophylla,* whose leaves, however, are completely glabrous and nitidulous.

14. **Streblosa hypomalaca** Brem. n. spec.; TYPUS: *Ibut 445* (L).

Streblosa hirta Ridl. in errore apud Ridl. in Kew Bull. 1926: 70. 1926, non Ridl. in Jour. As. Soc. Straits 57: 63. 1911.

Caulis usque ad 50 cm. altus, parte basali non visa, ad apicem 1.2 mm. diam., basin versus usque ad 4.5 mm. incrassatus, primum dense pubescens, deinde glabrescens, internodiis bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum dense, deinde sparse pubescente, 0.5–1.8 cm. longo instructa; lamina lanceolata, 8.5–13 cm. longa et 2.5–5 cm. lata, utroque extremo attenuata, supra nitidula, sicc. supra saturate, subtus dilute olivaceo-brunnea, costa canaliculata supra pilis paucis sparsa, subtus primum dense, deinde sparsius pubescente, haud lepidota, raphidibus inconspicuis, nervis utroque latere costae 10 vel 11, venulis subtus vix prominulis. Stipulae ambitu ovato-orbiculares, 3.7–4.7 mm. altae et 4–5 mm. latae, acutae, bilobae, lobis contiguis 1.2 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, puberulo-hirtello, 3 mm. longo instructae; ramuli 3, simplices, 9 mm. longi, post anthesin vix elongati, puberulo-hirtelli. Bracteae ramulorum lineares, 7 mm. longae, apice puberulo-hirtellae; bracteae florales etiam lineares, inaequales, cuiusque paris inferior 5 mm. longa et 1.3 mm. lata, superior 2.5 mm. longa et 0.7 mm. lata. Florum pares stipite 1 mm. longo instructi. Flores pedicellati; pedicelli apicem versus

sparse hirtelli, 2.3 mm. longi. Calyx 0.6 mm. altus, lobis ovatis tubo paulo longioribus. Corolla nondum aperta 1.8 mm. longa, tubo tereti. Fructus hirtellus; pyrenae rubrae.

Habitat insulam Siporam in Archipelago Mentaweiensi.

MENTAWEI ISLANDS. Sipora: near Sioban, *Ibut 445* (L, TYPUS).

Ibut accompanied Boden Kloss on his visit to the Mentawei Islands as collector for the Botanical Gardens, Buitenzorg, and the types of this species and the next were collected on the same dates as the specimens quoted by Ridley, l.c., under the names *Str. hirta* and *Str. microcarpa*. It can therefore hardly be doubted that they are identical with the latter.

The stipules of *Str. hypomalaca* are of the same shape as those of *Str. leiophylla, Str. polyantha* and *Str. scabridula,* but they are much smaller. A remarkable feature of this species is the comparatively short petioles: in this respect it resembles the Bornean *Str. bullata* and *Str. bracteolata.*

15. **Streblosa leiophylla** Brem. n. spec.; TYPUS: *Ibut 98* (L).

Streblosa microcarpa Ridl. in errore apud Ridl. in Kew Bull. 1926: 70. 1926, non Ridl., Fl. Mal. Pen. 2: 148. 1923.

Caulis ascendens, circ. 40 cm. altus, ad apicem 1.6 mm. diam., basi usque ad 5 mm. incrassatus, glaber, parte novella sicc. fuscescente, internodiis primum complanatis sed haud distincte sulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo glabro, 1–3.5 cm. longo instructa; lamina elliptico-oblonga, 9–15 cm. longa et 5.5–7.5 cm. lata, apice acuta vel subacuminata, basi contracta, supra nitidula, sicc. supra saturate et subtus dilute olivaceo-brunnea, utrimque glaberrima, subtus haud lepidota, raphidibus inconspicuis, nervis utroque latere costae 12 vel 13, venulis subtus prominulis. Stipulae ambitu ovato-orbiculares, 11 mm. altae et 10 mm. latae, acutae, bilobae, lobis contiguis 3 mm. longis, margine fugaciter ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, subglabro, 4 mm. longo instructae; ramuli 3 simplices, circ. 9 mm. longi, post anthesin vix elongati. Bracteae ramulorum linearilanceolatae, 6.5 mm. longae, subglabrae; bracteae florales lineares, extus dimidio superiore puberulae, inaequales, cuiusque paris inferior 4.5–5 mm. longa, superior 3–3.5 mm. longa. Florum pares stipite 1 mm. longo instructi. Flores pedicellati; pedicelli sparse hirtelli, 1.5 mm. longi. Calyx 0.8 mm. longus, lobis ovatis tubo paulo longioribus. Corolla matura nondum visa. Fructus apice puberulo-hirtellus; pyrenae luteolae.

Habitat insulam Archipelagi Mentaweiensis Siberut dictam.

MENTAWEI ISLANDS. Siberut: near the village of the same name, *Ibut 98* (L, TYPUS).

This species is easily recognizable by the completely glabrous stem and leaves. In the size of the stipules it resembles *Str. polyantha* and *Str. scabridula,* but in other respects it is more like *Str. hypomalaca,* the other species from the Mentawei Islands; its leaves are like those of the latter, on the underside smooth, not lepidote as in *Str. polyantha* and *Str. scabridula,* i.e. they lack the pallid protuberances by which in the latter the stomata are raised above the general level of the epidermis, and the flower-pairs are provided with a stipe of the same length as that of *Str.*

hypomalaca, and longer than that found in *Str. polyantha* and in *Str. scabridula.*

16. **Streblosa polyantha** Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851; Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 262. 1869.

Psychotria singalensis Miq., Fl. Ind. Bat. 2: 294. 1858, n. nom., Suppl. 223. 1860; Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1891.

Streblosa hirta Ridl. in Jour. As. Soc. Straits 57: 63. 1911, cuius folia angustiora videntur, adhuc incertum sed haud improbabile.

Caulis probabiliter circ. 25 cm. alta, sed parte basali in speciminibus investigatis non conservata, ad apicem 1.5 mm. diam., basin versus usque ad 3 mm. incrassatus, primum dense villosus, ultimo plus minusve glabrescens, internodiis primum bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum dense, deinde minus dense villoso, 1–3 cm. longo instructa; lamina elliptica vel oblongo-elliptica, 9–12 cm. longa et 4.5–5.7 cm. lata, apice acuta vel acuminata, basi contracta, opaca, sicc. supra olivacea et cellulis resiniferis nigro-punctata, utrimque sparse villosa, costa nervisque subtus tamen densius villosa, subtus lepidota, raphidibus supra ad costam distinguendis, ceterum inconspicuis, nervis utroque latere costae 9 vel 10, venulis subtus vix prominulis. Stipulae ambitu ovato-orbiculares, 12 mm. altae lataeque, acutae, breviter bilobae, lobis contiguis 3 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, circ. 3 mm. longo instructae; ramuli 3 simplices, circ. 9 mm. longi, post anthesin vix elongati. Bracteae omnes lineares, margine ciliatae, ramulorum 5 mm. longae, florales inaequales, cuiusque paris inferior 3.5 mm., superior 2.5 mm. longa. Florum pares stipite 0.5 mm. longo elati. Flores pedicellati; pedicelli glabri, circ. 1.5 mm. longi. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 1.5 mm. longa, tubo tereti. Fructus ad apicem hirtellus; pyrenae nigrae.

Habitat Sumatram Occidentalem et forsitan Peninsulam Malayanam.

SUMATRA. West Coast Res.: G. Malintang, *Korthals s.n.* (L, U, TYPI).
MALAY PENINSULA. Penang et Perak (*Str. hirta* Ridl.) n.v.

The leaves of *Str. hirta* Ridl. have been described as slightly narrower than those of *Str. polyantha* (10–15 cm. × 3.7–5 cm. instead of 9–12 cm. × 4.5–5.7 cm.), but as the description reveals no other points of difference, I am, for the moment, unwilling to accept it as specifically distinct. Ridley had seen no material of Korthals' species, and the existing descriptions were too incomplete to be of much use. It is, of course, not impossible that a renewed investigation will reveal the presence of more important differences.

Streblosa polyantha resembles the next species in many respects, but is easily distinguishable by the softness of the indumentum, by the somewhat broader leaves, which are provided with a smaller number of nerves and with resin cells in the epidermis of the upper side, and further, by the black pyrenes.

17. **Streblosa scabridula** Brem. n. spec.; TYPUS: *Docters v. Leeuwen 3194* (L).

Caulis ascendens, circ. 40 cm. altus, ad apicem 1.5 mm. diam., basi usque ad 5.5 mm. incrassatus, primum dense, deinde sparse hirsutus,

internodiis primum vix distincte bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum dense, deinde sparsius hirsuto, 1–3 cm. longo instructa; lamina lanceolato-oblonga, 9–14.5 cm. longa et 3–5 cm. lata, apice acuminata, basi contracta, supra nitidula, sicc. supra saturate et subtus dilute olivaceo-brunnea, utrimque sed praesertim subtus costa nervisque scabrido-hirsuta, subtus vix distincte lepidota, raphidibus inconspicuis, nervis utroque latere costae 12 vel 13, venulis subtus prominulis. Stipulae ambitu ovato-orbiculares, 17 mm. altae et 13 mm. latae, acutae, bilobae, lobis contiguis 4 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, 4 mm. longo instructae; ramuli 3 simplices, circ. 9 mm. longi, post anthesin vix elongati. Bracteae omnes lineares, margine dense ciliatae; florales inaequales, cuiusque paris inferior 4 mm., superior 3 mm. longa. Florum pares stipite 0.5 mm. longo instructi. Flores pedicellati; pedicelli sparse hirtelli, circ. 2 mm. longi. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 3 mm. longa, tubo tereti. Fructus apice hirtellus; pyrenae rubrae.

Habitat Sumatram Orientalem.

SUMATRA. East Coast Govt.: Asahan, Haboko, *Docters v. Leeuwen 3194* (L, TYPUS).

The differences between this species and the nearly related *Str. polyantha* have already been discussed. From the other species belonging to this genus they differ in the presence of fairly long hairs on the upper side of the leaves.

Subgenus **Para-streblosa.**

Folia subtus numquam lepidota. Stipulae parvae, parte basali indivisa brevi. Bracteae cuiusque paris suboppositae et subaequales. Flores semper subsessiles. Corollae tubus teres, intus fasciculis 5 pilorum instructus. Fructus nunc didymus, nunc globosus. — Species 18–25, in terra Borneënsi et insulis Filippinis endemicae.

Series **Costatae.**

Stipulae costa prominente et usque ad nodum praecedentem decurrente instructae; lobi stipulares contigui. — Species 18–23, omnes Borneënses.

18. **Streblosa chlamydantha** Brem. n. spec.; TYPUS: *Endert 2414* (BZ).

Caulis ascendens, circ. 1 m. altus, interdum pseudo-dichotome furcatus, ad apicem 2 mm. diam., basi usque ad 9 mm. incrassatus, primum puberulus, internodiis primum bisulcatis, sulcis tamen mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, deinde glabrescente, 0.8–6 cm. longo instructa; lamina oblanceolata vel elliptica, foliorum supremorum 12–13 cm. longa et 5.5–6.5 cm. lata, inferiorum usque ad 19 cm. longa et 9 cm. lata, omnium apice caudato-acuminata, basi contracta, opaca, sicc. supra saturate brunnea, subtus dilute olivaceo-brunnea, supra glabra, subtus primum costa nervis venulis dense puberula, ultimo plus minusve glabrescens, subtus raphidibus dense lineolata, nervis utroque latere costae plerumque 14–15, venulis subtus vix prominulis. Stipulae fugaces, parte indivisa 1 mm. alta, lobis e basi triangulari filiformibus, 3–4 mm. longis. Inflorescentiae pedunculo recurvato, usque ad 5 mm. longo instructae; ramuli 5, subumbellati, pri-

mum circ. 7 mm. longi et toti bracteis imbricatis obtecti, deinde bracteis exutis usque ad 3.5 cm. elongati, puberulo-pubescentes. Bracteae ramulorum oblanceolatae; bracteae florales obovatae, 3.7 mm. longae et 2.8 mm. latae, margine vix conspicue ciliolatae, ceterum glabrae, raphidibus conspicue lineolatae. Florum pares estipitati. Calyx subglaber, circ. 1.2 mm. altus, fere usque ad basin in lobos ovato-oblongos, imbricatos, distincte inaequales, margine vix conspicue ciliolatos partitus. Corolla 2 mm. longa. Fructus didymus, puberulus; pyrenae luteo-brunneae.

Habitat terrae Borneënsis partem centro-orientalem.

BORNEO. Southern and Eastern Division: West Kutai, near B. Puhus, alt. 70 m., *Endert 2414* (BZ, TYPUS).

Streblosa chlamydantha and *Str. longiscapa,* both inhabitants of the central part of East Borneo, are the tallest plants of this genus, for both reach a height of about one meter. They are, moreover, not rarely pseudo-dichotomously branched, but this peculiarity has also been observed in *Str. lampongensis.* From the other species of *Para-streblosa* they differ conspicuously in the didymous fruits. *Streblosa chlamydantha,* moreover, is easily recognizable by the large size of the bracts and by the large, distinctly unequal, imbricate calyx-lobes.

19. **Streblosa longiscapa** Brem. n. spec.; TYPUS: *Endert 3479* (BZ).

Caulis circ. 1 m. altus, interdum pseudo-dichotome furcatus, parte basali in speciminibus investigatis non conservata, ad apicem 2 mm. diam., basin versus usque ad 5 mm. incrassatus, glaber, internodiis primum bisulcatis, sulcis tamen mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, mox glabrescente, 0.8–4 cm. longo instructa; lamina lanceolata, rhomboidea vel elliptica, foliorum superiorum 6 cm. longa et 2.5 cm. lata, inferiorum usque ad 19 cm. longa et 9.5 cm. lata, omnium apice caudato-acuminata, basi contracta, opaca, sicc. supra saturate brunnea, subtus dilute olivaceo-brunnea, supra glabra, subtus primum costa nervis venulis dense puberula, ultimo plus minusve glabrescens, subtus raphidibus dense lineolata, nervis utroque latere costae in foliis supremis 8, in foliis aliis usque ad 17, venulis subtus vix conspicuis. Stipulae fugaces, parte indivisa circ. 2 mm. alta, lobis e basi triangulari filiformibus 4–6 mm. longis. Inflorescentiae pedunculo erecto, folio praecedenti subaequilongo vel eo paulo breviore, bicostato, glabrescente instructae; ramuli 9 paniculatim dispositi, semel dichasiales, puberulo-pubescentes; laterales centrali multo longiores. Bracteae ramulorum anguste triangulares, 2–3 mm. longae; bracteae florales lineares, 1.3–1.5 mm. longae, puberulo-pubescentes. Florum pares stipite 0.4 mm. longo instructi. Calyx puberulo-pubescens, 0.6 mm. altus, fere usque ad basin in lobos ovatos subobtusos partitus. Corolla matura nondum visa. Fructus didymus, subglaber; pyrenae luteolae.

Habitat terrae Borneënsis partem centro-orientalem.

BORNEO. Southern and Eastern Division: West Kutai, along the river Kiai, alt. 700 m., *Endert 4562* (BZ); H. Petak, alt. 500 m., *Endert 3479* (BZ, TYPUS).

This species is easily distinguishable by its long-pedunculate, paniculate inflorescences. As stated above, it is doubtless closely related to *Str. chlamydantha.*

20. **Streblosa lanceolata** Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1937.

Caulis ascendens, circ. 50 cm. altus, ad apicem 1.2 mm. diam., basi usque ad 3 mm. incrassatus, glaber, internodiis primum bisulcatis sed sulcis mox expletis, basi lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, mox glabrescente, 0.7–1.5 cm. longo instructa; lamina anguste lanceolata, 10–16 cm. longa et 2.0–3.3 cm. lata, apice caudato-attenuata, basi cuneata, opaca, sicc. supra saturate olivacea, subtus griseo-viridis, primum utrimque puberula, mox glabrescens, subtus raphidibus dense lineolata, nervis utroque latere costae 9 vel 10, venulis paucis vix conspicuis. Stipulae fugaces, parte indivisa 1 mm. alta, lobis e basi triangulari filiformibus 2 mm. longis. Inflorescentiae pedunculo patente, subglabro, usque ad 4 mm. longo instructae; ramuli plerumque 5 subumbellati, primum circ. 5 mm., deinde usque ad 15 mm. longi, infimi semel dichasiales, subglabri. Bracteae omnes triangulares, puberulae, circ. 1 mm. longae; bracteae florales quam ramulorum paulo latiores tamen, margine vix conspicue ciliolatae, deciduae. Calyx puberulus, 0.7 mm. longus, lobis ovato-triangularibus tubo subaequilongis. Corolla nondum nota. Fructus globosus, glaber; pyrenae luteolae.

Habitat terrae Borneënsis partem austro-occidentalem.

Borneo. Western Division: Upper Kapuas Mts., Bukit Obat, alt. 90 m., *Winkler 1392* (HBG, typus); ibidem, Liang Gagang, *Hallier 2391* (L).

Streblosa lanceolata, Str. urticina, Str. glabra and *Str. assimilis* resemble each other in the globose fruits, the short calyx-lobes and the shortly pedunculate inflorescences. *Streblosa lanceolata* and *Str. urticina* resemble each other also in other respects, for instance in the shape and size of the leaves and in the conspicuousness of the raphides on the underside, and also in the early deciduous bracts. The leaves of *Str. lanceolata,* however, are slightly narrower and shorter petiolate. The peduncles of this species too, are distinctly shorter. The leaves of *Str. glabra* and *Str. assimilis* are much wider, and the raphides are invisible; their bracts persist for a longer period.

21. **Streblosa urticina** Stapf in Trans. Linn. Soc. Bot. II. 4: 182, t. 13A, f. 1–10. 1894; Ridl. in Jour. As. Soc. Straits 57: 64. 1911, speciminibus in Sarawak lectis probabiliter exclusis (cf. *Str. assimilis* Brem.).

Caulis ascendens, probabiliter circ. 50 cm. altus, ad apicem 1.2 mm. diam., basi usque ad 3.5 mm. incrassatus, internodiis primum bisulcatis sed sulcis mox expletis, basi lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo 0.7–3 cm. longo instructa; lamina lanceolata vel oblongo-lanceolata, 11–16 cm. longa et 4–6 cm. lata, apice caudato-acuminata, basi contracta, opaca, sicc. supra saturate, subtus dilute olivacea, subtus raphidibus lineolata, nervis utroque latere costae 10–12, venulis subtus vix conspicuis. Stipulae e parte indivisa, 0.8 mm. alta, subpersistente et lobis e basi triangulari filiformibus, fugacibus compositae. Inflorescentiae pedunculo patente, 1.2–1.5 cm. longo instructae; ramuli plerumque 3, simplices vel semel dichasiales, primum 5–10 mm. longi, postea usque ad 25 mm. accrescentes. Bracteae omnes triangulares, 0.6 mm. longae, mox deciduae. Calyx 0.4 mm. altus, lobis rotundatis tubo aequilongis. Corolla matura nondum nota. Fructus globosus; pyrenae rubro-brunneae.

Habitat terrae Borneënsis partem septentrionalem.

Species haec solvenda est in varietates duas; forma typica a me vocatur:

Streblosa urticina Stapf var. **Stapfii** Brem. n. nom.

Caulis primum puberulus, deinde glabrescens. Folia petiolo primum dense, deinde sparsius puberulo instructa; lamina primum utrimque sed praesertim subtus costa nervisque puberula, deinde plus minusve glabrescens, raphidibus supra inconspicuis. Inflorescentiae dense puberulae. Fructus puberulo-hirtellus.

Habitat terrae Borneënsis partem septentrionalem.

BORNEO: British North Borneo: Mt. Kinabalu, Penokok, alt. 1000 m., *Haviland 1328* (K, TYPUS), n.v.; Penibukan, ridge east of Dahobang Ridge, alt. 1200–1500 m., *J. & M. S. Clemens 30698* (L); Penataran River, alt. 1000 m., *J. & M. S. Clemens 34029* (L).

The habit was described by Stapf as climbing, but it was pointed out already by Ridley l.c. that this is a mistake. The flowers are according to Stapf 4-merous, but as the plate accompanying his description clearly shows, they are in reality, as elsewhere in this genus, 5-merous.

Streblosa urticina Stapf var. **glabrescens** Brem. n. var.; TYPUS var.: *Amdjah*, Exped. *v. Genderen Stort, 371* (BZ).

Caulis glaberrimus. Folia mox tota glabrescentia, raphidibus utrimque lineolata. Inflorescentiae pedunculo glabro instructae, ceterum parce puberulae. Fructus subglaber.

Habitat terrae Borneënsis partem septentrionalem.

BORNEO. Southern and Eastern Division: Tidung, G. Labang, *Amdjah* (Exped. *v. Genderen Stort*) *371* (BZ, TYPUS varietatis).

The G. Labang, where this specimen was collected, lies near the British-North-Bornean frontier.

Streblosa urticina and *Str. lanceolata* are doubtless closely related. As stated above, the leaves of *Str. urticina* are slightly wider and longer petiolate, and the peduncles are much longer. *Streblosa urticina*, moreover, appears to be a plant occurring at a higher altitude: the specimens of the var. *Stapfii* at least were all collected between 1000 and 1500 m., whereas *Str. lanceolata* was found at a height of 90 m. *Streblosa urticina*, *Str. microcarpa* and *Str. axilliflora* are the only species found above 1000 m. altitude, but the two latter have also been collected in localities less high.

22. **Streblosa glabra** Val. in Engl., Bot. Jahrb. 44: 567. 1910; non Elm., Leafl. Philipp. Bot. 4: 1356. 1912, quae est *Str. palawanensis* Brem.; nec Merr., Enum. Philipp. Fl. Pl. 3: 564. 1921, quae est p.p. *Str. axilliflora* Merr. et p.p. *Str. palawanensis* Brem.

Streblosa platyphylla Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929.

Caulis ascendens, circ. 30 cm. altus, ad apicem circ. 2 mm. diam., basi usque ad 3 mm. incrassatus, primum vix conspicue puberulus, mox glabrescens, internodiis primum bisulcatis sed sulcis mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, deinde plus minusve glabrescente, 1.2–5 cm. longo instructa; lamina elliptica, 14–17 cm. longa et 8–10 cm. lata, apice breviter caudato-acuminata, basi contracta, opaca, sicc. supra saturate,

subtus dilute olivaceo-brunnea, primum utrimque sed praesertim subtus costa nervisque puberula, deinde glabrescens, raphidibus inconspicuis, nervis utroque latere costae circ. 10, venulis subtus vix prominulis. Stipulae subpersistentes, parte indivisa 2 mm. alta, lobis e basi triangulari filiformibus, 2.5 mm. longis, costa decurrente pro serie debili. Inflorescentiae pedunculo patente, primum dense, deinde sparse puberulo, 7–12 mm. longo instructae; ramuli plerumque 3, simplices vel semel dichasiales, subumbellati, dense puberuli, 5–10 mm. longi, post anthesin vix accrescentes. Bracteae omnes 2 mm. longae et sparse puberulae, ramulorum lineares, florales oblongae. Calyx puberulus, 0.4 mm. longus, lobis rotundatis tubo subaequilongis. Corolla 3.2 mm. longa, tubo tereti. Fructus globosus, puberulo-hirtellus; pyrenae luteolae.

Habitat terrae Borneënsis partem occidentalem.

BORNEO: Southern and Eastern Division: between Kondim Baru and Batu Babi, *H. Winkler 2751* (L, dupl. TYPI). BRITISH NORTH BORNEO: Elphinstone Prov., Tawao, *Elmer 21140* (U, AA, exempla typi *Str. platyphylla* Merr.).

The name of this species is somewhat misleading, for it is by no means completely glabrous. It may have influenced Merrill when he investigated the plants collected by Elmer at Tawao. Merrill described the leaves of the latter as "praesertim ad costam nervosque plus minusve sordide villosis," and a detached leaf added to one of the specimens in the herbarium of the Arnold Arboretum, indeed answers this description, but this leaf, which differs from the others not only in the nature of the indumentum but also in the colour it assumed in the press, and in the conspicuousness of the raphides, is either teratological or, more probably, part of another species. It is possible that the type-specimen consists of stems provided with this kind of leaves, but in view of the fact that the rest of the descripion agrees with that given above, this seems less probable than the supposition that the type too consists of leaves of both kinds. Acting on this supposition, I have reduced *Str. platyphylla* to *Str. glabra*. Whether the aberrant leaf belongs to a *Streblosa* species, is, of course, difficult to decide, but in view of the great similarity in the nervation, this does not look improbable to me.

Streblosa glabra differs from the two preceding species in the greater width of the leaves and in the inconspicuousness of the raphides, and also in the subpersistent stipules and bracts. From the next species it differs in the smaller size of the leaves, which, moreover, are provided with a smaller number of nerves, and in the smaller size of the flowers. The internodes of *Str. glabra* are less distinctly bicostate than those of the other species belonging to this series, but the ribs are nevertheless plainly visible.

23. **Streblosa assimilis** Brem. n. spec.; TYPUS: *Hallier 2725* (L).

Streblosa urticina Stapf apud Ridl. in Jour. As. Soc. Straits 57: 64. 1911, quoad specimina in Sarawak lecta, adhuc incertum.

Caulis probabiliter ascendens, sed parte basali in speciminibus investigatis non conservata, ad apicem 2 mm. diam., basin versus usque ad 7 mm. incrassatus, glaber, internodiis primum bisulcatis sed sulcis mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia

petiolo glabro, 1.5–8 cm. longo instructa; lamina elliptica, 17–27 cm. longa et 8.5–12 cm. lata, apice breviter caudato-acuminata, basi acuta vel rotundata sed prope petiolum semper contracta, opaca, sicc. supra saturate et subtus dilute olivaceo-brunnea, primum vix conspicue puberula, mox glaberrima, raphidibus inconspicuis, nervis utroque latere costae circ. 13, venulis subtus vix prominulis. Stipulae subpersistentes, parte indivisa 2 mm. alta, lobis e basi triangulari filiformibus. Inflorescentiae pedunculo patente, parce puberulo, 4 mm. longo instructae; ramuli 3 vel 5, subumbellati, simplices vel semel dichasiales, primum 5–7 mm. longi, post anthesin paulum elongati. Bracteae omnes ovatae, 2 mm. longae, subglabrae. Calyx puberulus, 0.6 mm. altus, lobis rotundatis tubo aequilongis. Corolla 6 mm. longa, tubo tereti. Fructus globosus, subglaber, maturus nondum notus.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO. Western Division: Upper Kapuas Mts., Liang Gagang, *Hallier 2725* (L, TYPUS); ibidem, *Hallier 2584* (L).

Very similar to the preceding species and by *Valeton* regarded as a mere variety of the latter (*Str. glabra* Val. var. *brevipes* Val. in sched.), but differing in several points: the stem is glabrous, more strongly bicostate and more robust, the leaves are larger, provided with a larger number of nerves and almost completely glabrous, the peduncle is shorter and the flowers are nearly twice as large.

It is not impossible that *Ridley 12430* from Puak and *12432* from Lundu in Sarawak, which Ridley referred to *Str. urticina*, but of which he says: "They are more robust with larger leaves, the stems quite woody and erect," may prove to belong to the species described above.

Series Ecostatae.

Stipulae et internodia ecostatae; lobi stipulares sinu latiore separati. — Species 24–25, in Palawan et insulis Filippinis endemicae.

24. **Streblosa palawanensis** Brem. n. spec.; TYPUS: *Merrill 11586* (L).

Caulis suberectus, circ. 40 cm. altus, ad apicem circ. 1.5 mm. diam., basi usque ad 4 mm. incrassatus, internodiis haud sulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum subtus fusco-puberulo, mox glabrescente, 1–5 cm. longo instructa; lamina elliptico-lanceolata, 9.5–17 cm. longa et 3.8–6.2 cm. lata, apice caudato-acuminata, basi contracta, primum subtus costa nervisque plus minusve puberula, nervis utroque latere costae 9–12, venulis subtus vix prominulis. Stipulae fugaces, parte indivisa 0.5–1 mm. alta, lobis linearibus, 1.5–1.8 mm. longis, sinu rectangulari 1.5 mm. lato separatis. Inflorescentiae pedunculo patente, fusco-puberulo, 5–9 mm. longo instructae; ramuli plerumque 3, semel dichasiales, subumbellati, fusco-puberuli, primum 0.5–1 cm. longi, deinde usque ad 2.5 cm. elongati. Bracteae omnes triangulares, fusco-puberulae, ramulorum usque ad 2 mm., florales 1–1.5 mm. longae. Calyx fusco-puberulus, 0.5 mm. altus, lobis late triangularibus tubo paulo longioribus. Corolla nondum matura 3.5 mm. longa, tubo tereti. Fructus globosus; pyrenae luteolae.

Habitat insulam Palawan dictam.

Species haec in varietates duas solvenda; forma typica a me vocatur:

Streblosa palawanensis Brem. var. **Merrillii** Brem. n. nom.

Lamina foliorum nitidula, sicc. utrimque olivacea, subtus raphidibus lineolata. Fructus vix conspicue hirtello-puberulus.

Habitat insulam Palawan dictam.

PALAWAN: Malampayan Bay, *Merrill 11586* (L, TYPUS, AA, dupl. typi).

Streblosa palawanensis Brem. var. **Elmeri** Brem. n. var.; TYPUS var.: *Elmer 12885* (L).

Streblosa glabra Val. in errore apud Elmer, Leafl. Philipp. Bot. 4: 1356. 1912; et apud Merr. Enum. Philipp. Fl. Pl. 3: 564. 1923, quoad specimen in Palawan lectum.

Lamina foliorum opaca, sicc. utrimque brunnea, raphidibus inconspicuis. Fructus conspicue hirtellus.

Habitat insulam Palawan dictam.

PALAWAN: Puerta Princesa, Mt. Pulgar, trail to Napsan, alt. 750 m., *Elmer 12285* (L, TYPUS var., AA, dupl.).

Elmer, l.c., describes the leaves of this plant as nitidulous, but in dried condition they are dull. A few inaccuracies of his description have already been pointed out in the introduction to this paper.

Streblosa palawanensis resembles *Str. axilliflora* in the ecostate internodes and in the wide gap between the two stipular lobes, but differs from that species in the absence of grooves in the young internodes, in the size and shape of the stipular lobes and in the shape of the gap by which the latter are separated from each other, and also in the somewhat larger size of the flowers.

25. **Streblosa axilliflora** Merr. in Philipp. Jour. Sci. Bot. 10: 144. 1915.

Streblosa glabra Val. in errore apud Merr., Enum. Philipp. Fl. Pl. 3: 564. 1923, quoad specimina in Luzon et Catanduanes lecta.

Caulis ascendens, plerumque 15–30 cm. altus, ad apicem circ. 1.5 mm. diam., basi usque ad 3 mm. incrassatus, internodiis haud profunde sed latius sulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo glabro vel primum fusco-puberulo, 1.5–5 cm. longo instructa; lamina nunc elliptico-lanceolata, 10–14 cm. longa et 4.2–5.4 cm. lata, nunc elliptica, circ. 8 cm. longa et 5.5 cm. lata, apice acuta vel vix conspicue acuminata, basi contracta, opaca vel nitidula, sicc. supra saturate et subtus dilute olivacea, primum subtus costa nervisque fusco-puberula, deinde plus minusve glabrescens, raphidibus subtus interdum distinguendis, nervis utroque latere costae 9 vel 10, venulis subtus vix prominulis. Stipulae fugaces, parte indivisa 1.5 mm. alta, lobis e basi circ. 3 mm. lata sensim attenuatis, 6–7 mm. longis, sinu 1–1.5 mm. lato, basi rotundato separatis. Inflorescentiae pedunculo patente, fusco-puberulo, circ. 3 mm. longo instructae; ramuli plerumque 3, semel dichasiales, subumbellati, fusco-puberuli. Bracteae ramulorum triangulares, 3–4 mm. longae; bracteae florales multo minores, plerumque circ. 1 mm. longae, margine parce ciliolatae. Calyx fusco-puberulus, 0.6 mm. altus, lobis triangularibus tubo paulo longioribus. Corolla circ. 2 mm. longa. Fructus globosus, hirtello-puberulus; pyrenae luteolae.

Habitat partem insulae Luzoniae australem et insulam Catanduanes dictam.

Species haec in varietates probabiliter plures solvenda est quarum tres ibi descriptae sunt; forma typica a me vocatur:

Streblosa axilliflora Merr. var. **angustifolia** Brem. n. nom.

Caulis glaber vel primum fusco-puberulus. Lamina foliorum elliptico-lanceolata, 10–14 cm. longa et 4.2–5.4 cm. lata. Ramuli inflorescentiarum post anthesin vix elongati, circ. 8 mm. longi.

Habitat partem Insulae Luzoniae australem.

LUZON. Camarines Sur: Panagan River, alt. 700 m., *Edaño* [B. Sc.] *76348* (NY); Kamugong River, alt. 400 m., *Edaño* [B. Sc.] *75901* (NY); Sorsogon: Irosin, Mt. Bulusan, *Elmer 14605* (L, U, NY); s.l. *Ramos* [B. Sc.] *23560* (NY).

Streblosa axilliflora Merr. var. **latifolia** Brem. n. var.; TYPUS var.: *Ramos* & *Edaño* [B. Sc.] *45421* (NY).

Caulis densius puberulus. Lamina foliorum elliptica, circ. 8 cm. longa et 5.5 cm. lata. Ramuli inflorescentiarum post anthesin vix elongati, circ. 8 mm. longi.

Habitat partem Insulae Luzoniae australem.

LUZON. Tayabas: Casiguran, *Ramos* & *Edaño* [B. Sc.] *45421* (NY, TYPUS var., AA, dupl.).

Streblosa axilliflora Merr. var. **laxiflora** Brem. n. var.; TYPUS var.: *Ramos* & *Edaño* [B. Sc.] *75308* (NY).

Caulis glaber. Lamina foliorum elliptico-lanceolata, circ. 12 cm. longa et 5 cm. lata. Ramuli inflorescentiarum post anthesin usque ad 1.8 cm. elongati.

Habitat insulam Catanduanes dictam.

CATANDUANES: Mt. Abucay, alt. 1400 m., *Ramos* & *Edaño* [B. Sc.] *75308* (NY, typus var.); ibid., alt. 600 m., *Ramos* & *Edaño* [B. Sc.] *75466* (NY); Bato trail to Viga, alt. 250 m., *Ramos* & *Edaño 75557* (NY).

It is not impossible that this variety, when more material becomes available, will prove to be sufficiently distinct to be raised to specific rank.

Merrill, l.c., quotes specimens collected in Samar, but as I did not see them, I am unable to express an opinion with regard to their taxonomic position.

Index Specierum

12. *anambasica* Brem. n. spec. — Anambas Islands.
23. *assimilis* Brem. n. spec. — West Borneo.
25. *axilliflora* Merr. in Philipp. Jour. Sci., Bot. 10: 141. 1915 — Philippines.
    var. *angustifolia* Brem. n. nom. — Luzon.
    var. *latifolia* Brem. n. var. — Luzon.
    var. *laxiflora* Brem. n. var. — Catanduanes.
4. *bracteata* Ridl. in Jour. As. Soc. Straits 57: 64. 1911 — West Borneo.
11. *bracteolata* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 295. 1937 — West Borneo.
10. *bullata* Merr. op. cit. 296 — West Borneo.
18. *chlamydantha* Brem. n. spec. — East Borneo.
13. *deliensis* Brem. n. spec. — East Sumatra.
22. *glabra* Val. in Bot. Jahrb. 44: 567. 1910 — East Borneo.
    hirta Ridl. in Jour. As. Soc. Straits 57: 63. 1911, forsitan = *polyantha*, n.v.
14. *hypomalaca* Brem. n. spec. — Mentawei Islands.

8. *Johannis-Winkleri* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1937. — West Borneo.

3. *lampongensis* Brem. n. spec. — South Sumatra.

20. *lanceolata* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1937 — West Borneo.

15. *leiophylla* Brem. n. spec. — Mentawei Islands.

19. *longiscapa* Brem. n. spec. — East Borneo.

6. *maxima* Brem. n. spec. — North Borneo.

2. *microcarpa* Ridl., Fl. Mal. Pen. 2: 148. 1923 — Malay Peninsula and Sumatra.

7. *multiglandulosa* Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929 — North Borneo.

5. *myriocarpa* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 296. 1937 — West Borneo.

24. *palawanensis* Brem. n. spec. — Palawan.
var. *Elmeri* Brem. n. var. — Palawan.
var. *Merrillii* Brem. n. nom. — Palawan.
platyphylla Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929 = *glabra*.

16. *polyantha* Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851 — West Sumatra and perhaps Malay Peninsula (hirta Ridl.).
puberula Merr. in Papers Mich. Acad. Sci. 23: 195. 1938 = *microcarpa*.
pubescens Ridl. in Jour. As. Soc. Straits 57: 63. 1911 — Malay Peninsula — species incertae sedis.

17. *scabridula* Brem. n. spec. — East Sumatra.

1.* *tortilis* (Bl.) Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851 (Psychotria Bl.) Java, West Sumatra.
var. β Khs. l.c. — West Sumatra — incertae sedis.

9. *undulata* Khs. op. cit. 247; interpr. Val. in Engl., Bot. Jahrb. 44: 568. 1910 — South-east Borneo.

21. *urticina* Stapf in Trans. Linn. Soc. Ser. 2, Bot. 4: 182. 1894 — North Borneo.
var. *glabrescens* Brem. n. var. — North Borneo.
var. *Stapfii* Brem. n. nom. — North Borneo.
Wallichii Merr. in Papers Mich. Acad. Sci. 23: 194. 1938, n. nom. illeg. = *microcarpa*.

Streblosa species etiam sub nomine generico Psychotria cognitae.

Psychotria singalensis Miq., Fl. Ind. Bat. 2: 294. 1857, n. nom. = *Streblosa polyantha* Khs.

Psychotria tortilis Bl., Bijdr. Fl. Ned. Ind. 958. 1826 = *Streblosa tortilis* (Bl.) Khs.

Psychotria undulata (Khs.) Miq., Fl. Ind. Bat. 2: 294. 1857, n. comb. (non Poir., Encycl. Suppl. 4: 591. 1816, sphalm. = *P. undata* Jacq., Hort. Schoenbr. 3: t. 260. 1798) = *Streblosa undulata* Khs.

Zeist,
Holland.

A MONOGRAPH OF THE GENUS POMAZOTA RIDLEY (RUBIACEAE)

C. E. B. Bremekamp

INTRODUCTION

THE IDENTITY OF COPTOPHYLLUM KHS. AND POMAZOTA RIDL. CHOICE OF THE TYPE SPECIES

Pomazota Ridl. was based on a plant collected in the Malay Peninsula. The valvate aestivation of its corolla-lobes, the dehiscent fruit and numerous angular and alveolate seeds prove that it belongs to the Hedyotideae. Ridley's plant shows a striking resemblance to the species of the genus *Coptophyllum* Khs., but Ridley was of opinion that it differs from them in the nature of its fruits. Those of *Pomazota* are stated to open by a lid, whereas those of *Coptophyllum* are assumed to be indehiscent. Ridley's idea of the fruits of the latter, however, was apparently based on a somewhat superficial study of the literature. It is true that both in Bentham & Hooker's "Genera Plantarum" and in Schumann's monograph of the family in Engler & Prantl's "Natürliche Pflanzenfamilien" the genus is reckoned to the Mussaendeae, i.e. to a tribe in which the fruits are said to be indehiscent, but Korthals himself had been less positive, for he had described the fruit (in Ned. Kruidk. Arch. 2 (2): 161. 1851) as "capsula membranacea indehiscens (?) bilocularis." That the interrogation mark in this sentence belongs to "indehiscens" and not to "bilocularis" need not be doubted. Whether the septum of a bilocular ovary persists or disappears in the ripening fruit is taxonomically, as a rule, but of little importance, and if Korthals had felt the slightest uncertainty on this point, he certainly would have preferred to pass on without mentioning the number of fruit-cells. Moreover, Bentham & Hooker, as well as Schumann, and Ridley also, had apparently overlooked Miquel's description of *Coptophyllum? capitatum* (Fl. Ind. Bat. 2: 348. 1857), the species quoted by Ridley in his "Flora of the Malay Peninsula," for Miquel described the fruits of this plant as "capsulae vertice apertae."

As the fruits of *C. pilosum*, the second species described by Miquel (in Ann. Mus. Bot. Lugd.-Bat. 4: 230. 1869), open in the same way as those of *C. capitatum*, and as up to now no further species of this genus have been made known, we may safely conclude that the difference in the nature of the fruits on which Ridley had based his generic distinction, is in reality non-existent. Moreover, as the real differences existing between the species of *Coptophyllum* and *Pomazota* are all found to be of minor importance, it is clear that the two genera must be considered identical.

A difficulty to the view here brought forward lies in the fact that

Korthals' generic description deviates in two points from that given below, the corolla being described as naked inside and the calyx-lobes as oblong. Another objection might be found in the obtuse stipules mentioned in the description of the type-species, but these incongruities should not be taken too seriously. The oblong calyx-lobes offer no difficulty at all, for calyx-lobes of this shape really occur in some of the species, but as they can not be considered a general feature of the genus, they could, of course, find no place in my description. A corolla naked inside and obtuse stipules, however, occur in none of the species below referred to *Pomazota,* and their presence in the type-species of *Coptophyllum,* therefore, would form a serious obstacle to my view of the identity of the two genera. This obstacle can only be overcome by assuming that the observations of Korthals were incorrect. Mistakes of this kind may easily come about when the material is incomplete and in a bad condition. The ring of spreading hairs in the upper part of the corolla-tube, although a very striking feature in the fully developed flower, is easily overlooked when the flowers are still in bud, for these hairs are at first firmly pressed against the wall. The sharp points of the stipules may pass unnoticed, because they are easily broken off: it is quite conceivable that they may have been absent in Korthals' specimens. As the latter are lost, the question of their generic position can not be settled with absolute certainty, but as the rest of Korthals' description agrees well with that given below, e.g., in the very characteristic shape of the stigmata, and as we know no other genus which fits the description equally well, there is apparently no reason to regard *Coptophyllum* as a "genus dubium" or to doubt its identity with *Pomazota.* However, as the name *Coptophyllum* Khs. (in Ned. Kruidk. Arch. 2 (2): 161. 1851) is a later homonym of *Coptophyllum* Gardner (in Hook., Ic. Pl. 5: t. 477, 478. 1842), it can not be retained, and is to be replaced by *Pomazota* Ridl. (in Trans. Linn. Soc. Bot. II 3: 308. 1893).

When an older generic name is rejected in favour of a more recent one, the question arises as to which species should be regarded as the type. It can obviously be solved in either of two ways, for our choice depends on what we consider more important: the connection with the name which is to be retained or that with the taxonomic conception which found its first expression in the rejected name. The "International Rules of Botanical Nomenclature" give us no guidance. It is true that Art. 5 says: "In the absence of a relevant rule or where the consequences of rules are doubtful, established custom must be followed," but as the type-method is still comparatively young, one can in this case hardly speak of "established custom." On an earlier occasion (in Jour. Arnold Arb. 21: 34. 1940), when the type of the genus *Urophyllum* Wall. had to be fixed, I chose the second alternative, because it appeared to me that the taxonomic conception should be considered more important that a mere name. As type of the genus *Urophyllum* Wall. I therefore chose *U. arboreum* (Reinw. ex Bl.) Khs. This species namely is the type of the genus *Wallichia* Reinw. ex Bl., and *Wallichia* Reinw. ex Bl. is the name under which the taxonomic

conception now known as *Urophyllum* Wall. was first put forward. If the same rule is to be applied in the present case, the type will have to be looked for among the species originally referred to *Coptophyllum* Khs. This, however, offers a new difficulty.

The genus *Coptophyllum* Khs. was based on a plant collected on Mt. Singalang in Western Sumatra. It was described under the name *C. bracteatum* Khs. Under ordinary circumstances this species, of course, should be regarded as the type, but unfortunately its identity is not fully certain. As stated above, the specimens on which it was based are lost, and the description is not sufficiently detailed to allow its identification. Apart from its occurrence in the Uplands of Padang, there are but two points in the description which might give us a clue: the oblong calyx-lobes and the presence of stiff hairs on the upper side of the leaves. More or less oblong calyx-lobes are found in *Pomazota assimilis* Brem. n. spec., a near ally of *Coptophyllum capitatum* Miq., and also in *Pomazota rivularis* Hend. and the nearly related *P. scabiosiflora* Brem. n. spec. and *P. batuensis* Brem. n. spec. The two last-named species need not be taken into consideration, for in *P. scabiosiflora* the leaves are glabrous on the upper side and *P. batuensis* has not yet been found outside the Batu Islands. *Pomazota assimilis* and *P. rivularis* fit Korthals' description almost equally well, and as both are known to occur in the mountains of Sumatra, it is impossible to make a choice; moreover, Korthals' species may have been different from both. Therefore, as *Coptophyllum bracteatum* Khs. can not be identified with certainty, it can not be accepted as the type of the genus, and we will have to fix our choice on the species which comes next in age. This is *C. capitatum* Miq. Miquel was apparently at first not fully convinced that this species belonged to *Coptophyllum* Khs., for in the original description he put an interrogation mark behind the generic name, but this was dropped in his paper on the Rubiaceae of the Malay Archipelago in Ann. Mus. Bot. Lugd.-Bat. 4: 1869.

It is a rather curious coincidence that the genus had also drawn Blume's attention. Among the unclassified Rubiaceae of the Utrecht Herbarium I found a specimen of *Pomazota pilosa* (Miq.) Brem. n. comb. (*Coptophyllum pilosum* Miq.) which had been collected by Kühl and van Hasselt at the Tji Djralang in S. W. Bantam. The collectors, who regarded it as an *Argostema*, had provided it with a short diagnosis, but the really interesting point of the specimen is that it also bore a label in Blume's handwriting with the name "*Lasiagathis humilis* Bl." The genus *Lasiagathis*, however, has never been published.

THE TAXONOMIC POSITION OF THE GENUS

As I have already pointed out in my paper "On Urophyllum Wall. (Rubiaceae) and its nearest allies" (in Rec. Trav. Bot. Néerl. 37: 171. 1940), the distinction between the tribes Hedyotideae, or Oldenlandieae

as they are called by Schumann, and Mussaendeae, which rests merely on the dehiscence or indehiscence of the fruits, can not be kept up. "If the two tribes, Hedyotideae and Mussaendeae," I wrote, l.c., "are united, the bulk of the genera at present included in them, form a natural group, characterized not only by the pluri-ovular ovary cells and the valvate aestivation of the corolla lobes, but also by the axile or nearly axile, peltate or subpeltate placentation and by the ovoid or angular, yellowish, reddish or brown, more or less distinctly alveolate, striate or punctate seeds. Genera in which some of these characters are wanting, for instance those with a clavate or columnar placenta and smooth seeds, should be excluded." With these misplaced genera I reckon, among others, *Schradera* Vahl, the twin genera *Coccocypselum* [P. Br.] Sw. and *Lipostoma* D. Don, *Tammsia* Karst., which probably belongs to another family, *Carphalea* Juss., *Dirichletia* Klotzsch, *Placopoda* Baill., *Payera* Baill., *Jackia* Wall., *Cruikshankia* Hook. and the two genera *Carlemannia* Benth. and *Sylvianthus* Hook. f., which do not belong to the Rubiaceae but should find a place in the vicinity of the Caprifoliaceae.

Among the genera which are left in the tribe two smaller groups have already been recognized. One comprises *Urophyllum* Wall. and the nearly allied genera *Antherostele* Brem., *Didymopogon* Brem., *Maschalocorymbus* Brem., *Pravinaria* Brem., *Praravinia* Khs., *Rhaphidura* Brem., *Leucolophus* Brem., *Lepidostoma* Brem., *Pleiocarpidia* K.Sch. and *Stichianthus* Val., characterized by the axillary position of the inflorescences, dioecious flowers, a pluri-locular ovary, paired, at first nearly axile placentas, which, when the fruit begins to swell, shift towards the middle of the radiating septa, stamens or staminodes inserted at or near the mouth of the tube and more or less distinctly spreading stigmata. Another group consisting of *Sabicea* Aubl. and its allies: *Pauridiantha* Hook. f., *Pamplethantha* Brem., *Stelechantha* Brem., *Commitheca* Brem., *Poecilocalyx* Brem., *Rhipidantha* Brem., *Temnopteryx* Hook. f. and *Pentaloncha* Hook. f., all provided with heterostylous flowers, a 2-, 4- or 5-locular ovary whose cells are in the upper half divided by false septa, axile placentas which, as the false septa penetrate in them for some distance, are more or less obcordate, stamens which at least in the long-styled flowers are inserted in the middle of the tube, and more or less cohering stigmata. A third group, formed by *Mussaenda* L. and some other genera, is characterized by a curious form of heterostyly, the long-styled flowers being female and the short-styled ones male; the genera belonging to this group, however, have not yet been sufficiently studied. Still less is known of the remaining ones, and for this reason the position of the genus *Pomazota* Ridl. can not yet be satisfactorily ascertained.

The most important characters of *Pomazota* appear to be the stiff hairs present on all the young parts but especially conspicuous along the margin of the leaves, stipules, bracts and calyx-lobes and also on the midrib of the corolla-lobes, the terminal capituliform inflorescence with its 4, 5 or 8 involucral bracts, the presence of a hair-ring in the upper part of the

corolla-tube, the insertion of the stamens at or below the middle of the tube, the short and thick, rectangularly spreading stigma-lobes, always protruding beyond the anthers and the ring of hairs in the corolla-tube, and finally the globose capsule which in the end opens by the disintegration of a cell-zone at the base of the calyx, after which the upper part including the calyx and the rather conspicuous disk is thrown off in the form of a lid.

The nearest approach to these characters is found in the genus *Klossia* Ridl. Its only species is a nearly glabrous, thin leaved plant, which at first sight looks rather unlike the hirsute *Pomazota* species. In reality, however, it differs from the latter in minor points only. Its inflorescences are somewhat less strongly condensed, the bracts being smaller and the flowers distinctly pedicellate, the bracts and the rather large, in the bud overlapping, calyx-lobes are eciliate, the stamens inserted a little way above the middle of the tube and provided with papillate instead of glabrous filaments, and the stigmata are obovate and flattened and remain attached to each other. The corolla-tube, however, is provided at the upper end with a ring of hairs, and the fruits open with a lid. The disintegration-zone on the other hand, lies inside, not outside the calyx, so that the latter persists on the open fruit.

Some other genera belonging to this tribe resemble *Pomazota* in the nature of the inflorescence. They are *Siderobombyx* Brem., a new genus to be described hereafter, *Keenania* Hook. f., *Campanocalyx* Val., *Myrioneuron* R.Br., *Polysolenia* Hook. f., *Leptomischus* Drake, *Mouretia* Pitard and *Lucinaea* DC. None of them, however, appears to be a close ally.

The only species of *Siderobombyx* shows a strong resemblance to *Pomazota*. Its large ovate acuminate stipules are indistinguishable from those of the latter; its inflorescences are terminal and capituliform, and, in the same way as in some of the *Pomazota* species, soon pushed aside by a branch arising from the axil of one of the two highest leaves; the capitula moreover are surrounded by large bracts, and the calyx-lobes are, like those of *P. capitata* and *P. assimilis*, densely hairy. The hairs themselves, however, are of a different kind; the young leaves are not covered with stiff rust-brown hairs like those of the *Pomazota* species, but with the same silky reddish brown pubescence which gives the young leaves in the genus *Xanthophytum* Reinw. ex Bl. and in the nearly related and perhaps not sufficiently distinct genera *Paedicalyx* Pierre ex Pitard and *Xanthophytopsis* Pitard their peculiar lustre. The hairs on the bracts and calyx-lobes too are soft and thin like those covering the young leaves and not stiff like those of the *Pomazota* species. This, however, is by no means the only difference. The capitula are not surrounded by 4, 5 or 8 ovate, oblong or spathulate bracts, but by two very large reniform ones; the corolla-tube is not provided with a ring of hairs near its upper end, but the whole upper half is densely villous on the inside, and the fruit is not a capsule opening by a lid, but a dipyrenous drupe. In the only specimen which could be studied the filaments, moreover, proved to be

much shorter than in the *Pomazota* species, whereas the clavate style was longer; the latter proved to be shortly two-lobed. The shortness of the filaments and the comparatively great length of the style suggest that the specimen represents the long-styled form of a dimorphic species.

In the genera *Keenania* and *Myrioneuron* too the flowers are apparently heterostylous, but the heterostyly is here probably combined with dioecism. The type-species of the genus *Keenania* at least was based on a specimen with sterile anthers, and of the flowers of *K. ophioglossoides* Drake and *K. tonkinensis* Drake figured by Pitard in Lecomte, Fl. Gén. Indo-Chine 3: f. 16 (8, 9), the first are long-styled and maybe female, whereas the second are short-styled and, as the stigmata seem to be rudimentary, probably male. As the description of the vegetative parts of these two species do not reveal appreciable differences, it is not impossible that they are conspecific. Similarly the description of *Myrioneuron tonkinense* Pitard (op. cit. 193) appears to be based on a male specimen and that of *M. pubiflorum* Pitard (ibid.) on a female one. The fruits of *Myrioneuron* are exsuccous dipyrenous drupes whose pyrenes open ultimately on the inner side; the fruits of *Keenania* are unknown. *Campanocalyx* apparently comes very near to *Keenania,* from which it differs, however, conspicuously by its campanulate calyx; its floral mechanism being as yet incompletely known.

Polysolenia is very imperfectly described, but it seems to me that this genus too is heterostylous, the type-specimen representing the short-styled form. At any rate, as its stamens are inserted in the upper part of the tube and overtop the style, the genus is apparently no near ally of *Pomazota.* Its fruits are unknown. The description of *Leptomischus* Drake, whose fruits open in the same way as those of *Pomazota* and *Klossia,* does not differ very much from that of *Polysolenia,* and I therefore consider these two genera closely related. In *Mouretia* Pitard too the stamens are inserted in the upper part of the tube. As the floral mechanism of all these genera is quite different from that found in *Pomazota* and *Klossia,* they are apparently not very nearly allied to them.

The capitula of *Lucinaea* are naked and therefore not readily comparable to those of *Pomazota* and *Klossia.* In its truncate calyx and thick, smooth testa the genus differs moreover so considerably from the other members of the tribe that its inclusion in it seems hardly justified.

Capsules opening in the same way as those of *Pomazota* and *Klossia* are found in *Argostema* Wall. In the shortness of the corolla-tube and in the syngenesious anthers this genus, however, possesses characters which give it a rather isolated position in the tribe. Perhaps of more importance are the points of resemblance between *Pomazota* and *Klossia* and the genus *Ophiorrhiza* L., whose capsules are also apically dehiscent. The partial inflorescences are cymose like those of the two first-named genera; the stamens are inserted in the lower half of the tube and the style overtops the anthers. However, as none of these characters are confined to these genera, their value should not be overrated.

Pomazota reptans Backer ex Brem. seems at first sight to differ essentially from the other species by its decumbent and creeping shoots and the small size of its leaves and capitula. A more detailed analysis, however, does not corroborate this view, for important points of difference are not brought to light. The resemblance in the vegetative parts of the other species is very strong indeed. *Pomazota Vanleeuweni* Brem. is recognizable by its small size and by the scabridity of the upper side of the leaves, *P. scabiosifolia* Brem. by its leaves, glabrous on the upper side, and *P. simalurensis* Brem. by its pseudo-dichotomy, but the vegetative parts of the six remaining species are almost indistinguishable. The ovate-acuminate stipules end in an undivided tip in eight of the ten species recognized in this paper, in *P. simalurensis* and *P. scabiosiflora* in two fairly long, parallel teeth.

With regard to the position of the inflorescences the ten species form two easily distinguishable groups. In the first there is never more than a single inflorescence at a node, whereas in the second the majority are found in pairs. In the second group the peduncles are moreover always provided with a pair of scales at the base, whose median position proves them to be the stipules belonging to a pair of suppressed leaves; in the first group these scales are always wanting. Their presence proves that the inflorescences in the second group are not really axillary, as they might seem at first sight, but that they are borne by axillary brachyblasts consisting of a single, very short internode; in reality they are terminal. In the first group too the inflorescences are terminal, but here they are found at the end of an ordinary leafy shoot. They are, however, soon overtopped by one or, rarely, two innovation-shoots developing from the axil of one of the two highest leaves or of both of them. If a single shoot develops, the inflorescence becomes pseudo-axillary, the innovation-shoot forming the continuation of the main shoot. The stems of these plants, therefore, are sympodia. If two innovation-shoots develop (*P. simalurensis*), the plants become pseudo-dichotomously branched. Another difference between the two groups is found in the structure of the capitula. In the first group the flowers are, at least in the axils of the outer bracts, arranged in triads or in several-flowered cymes, whereas in the second group they are always solitary.

The involucre consists of 4, 5 or 8 bracts, which differ but slightly from the inner ones. Tetramerous and pentamerous involucres occur in both groups, but the octamerous ones are confined to the first. In the first group the bracts of the tetramerous involucres are decussate, but those of *P. rivularis*, the only species of the second group in which the involucre is tetramerous, form a whorl, and are found to alternate with the four immediately following inner ones; in the pentamerous involucres the arrangement looks at first sight to be quincunxial, but here too the involucral bracts alternate with the adjoining inner ones. The octamerous

involucres consist of 4 larger bracts alternating with 4 smaller ones, but the morphological value of the latter is not always the same. In *P. simalurensis* the four larger bracts are decussate, and each of them subtends a cyme. The bracts subtending the branchlets of the two lower cymes are conduplicate and twisted at the base so that the upper part lies more or less in the same plane as the main bract: these two pairs of lateral bracts form the smaller bracts of the involucre. In *P. assimilis* Brem. and *P. capitata* (Miq.) Brem. the eight involucral bracts are united at the base, and they all subtend cymes. Those subtended by the four larger ones form an outer circle, those belonging to the four smaller ones recede a little towards the centre. All the cymes, however, are strongly dorsiventral, some of the bracts being larger than the others and shifted to the outside. The involucral bracts themselves may therefore easily be taken for sterile, for when they are removed, a complete circle of smaller bracts is revealed behind which the flowers are hidden. There is, therefore, an important difference between these species and *P. simalurensis* in the arrangement of the involucral bracts. Whereas the arrangement in the latter is strictly decussate, that of the involucral bracts of *P. assimilis* and *P. capitata* is to be regarded either as quaternate or as a somewhat modified form of the $\frac{3}{8}$-phyllotaxis. The occurrence in the same genus of a somewhat modified quincunxial arrangement forms an argument in favour of the latter supposition.

The capitula of *P. reptans, P. Vanleeuweni* and *P. simalurensis* contain inside the involucre but one or two pairs of main bracts; the number of flowers in these capitula is accordingly but small. In *P. assimilis* and *P. capitata* the number of main bracts inside the involucre is difficult to determine, but it is probably not larger than in the species just mentioned. Owing to the large number of flowers in each of the cymes, the total number is nevertheless very considerable, larger in fact than in any other species of this genus. In the five remaining species the inner bracts form a dense rosette. In *P. assimilis* the first lateral bracts of the outer cymes are at the base on each side provided with a patent lobe. In the nearly related *P. capitata* these lobes are usually absent; occasionally, however, a single one may be present. The involucral bracts of *P. sylvestris* Ridl. and *P. pilosa* (Miq.) Brem. are carinate, the five keels forming a prominent feature of the involucre.

In *P. assimilis, P. capitata* and *P. sylvestris* all bracts subtend cymes. In the other species belonging to the first group the outer bracts subtend pentads or triads, whereas in the axils of the inner ones the cymes are reduced to paired or single flowers; in *P. reptans* the cymes are occasionally all reduced in this way. In the second group the flowers are always solitary in the axils of the bracts, but the presence of a pair of bracteoles at the base of each flower proves that the latter represents a cyme.

In the first group the cymes are sometimes shortly stipitate, the stipe being partly or entirely fused with the subtending bract; the flowers, on the other hand, are always sessile. In the second group, where the cymes

are reduced to single flowers, the stipe is always fused with the stalk-like base of the bract; in *P. rivularis* the flowers themselves are shortly pedicellate, i.e. in this species there is a distinct internode between the bracteoles and the base of the ovary.

The calyx-lobes are ovate-orbicular in *P. pilosa,* ovate-lanceolate in *P. reptans, P. Vanleeuweni, P. sylvestris* and *P. simalurensis,* oblong in *P. rivularis, P. scabiosiflora* and *P. batuensis,* linear-oblong in *P. assimilis,* and linear in *P. capitata.* In the two latter species they are inside and outside densely hirsute; in the other ones ciliate.

In the species of the second group and in *P. reptans* the ovary and capsule are glabrous; in the other species of the first group they are always pilose.

KEY TO THE SPECIES

1. Inflorescences either solitary at the nodes or in the forks of a pseudo-dichotomously branched stem; the youngest inflorescence at the end of the shoot. Base of the peduncle never provided with scales. Flowers at least in the axils of the outer bracts in cymes or triads.....2.
: Inflorescences usually opposite and always lateral. Base of the peduncle always provided with a pair of stipular scales. Flowers always solitary in the axils of the bracts.....8.
2. Involucral bracts either 4 or 8.....3.
: Involucral bracts 5.....7.
3. Involucral bracts 4. Leaves not more than 6 cm. long.....4.
: Involucral bracts 8. Leaves much longer.....5.
4. Shoots decumbent. Leaves ovate-elliptic or elliptic, acute or suddenly contracted at the base, on the upper side sparsely hirsute and not more than 4 cm. long. Inflorescences subsessile. Ovary and capsule glabrous. — South Sumatra and West Java — .....1. *P. reptans* Backer ex Brem.
: Shoots erect. Small, not more than 7 cm. high herb. Leaves lanceolate-elliptic, cuneate at the base, on the upper side scabrid, 4–6 cm. long. Inflorescence pedunculate. Ovary and capsule pilose. — East Sumatra — .....2. *P. Vanleeuweni* Brem.
5. Pseudo-dichotomously branched plant. Tip of the stipule bipartite. Involucral bracts free, the 4 larger ones decussate, each of them subtending a cyme; the two pairs of smaller ones representing the first pairs of bracts of the cymes subtended by the lower pair of involucral bracts. — Simalur (Simeulowe) — .....3. *P. simalurensis* Brem.
: Sympodial plants. Tip of the stipule undivided. Involucral bracts united at the base in a flat receptacle, all subtending cymes.....6.
6. Bracts subtending the branchlets of the cymes at the base on each side with a patent lobe. Calyx-lobes not more than 3 mm. long, covered with ferrugineous hairs. — Sumatra and the islands to the west of it — .....4. *P. assimilis* Brem.
: Bracts never with two and rarely with a single lateral lobe. Calyx-lobes at least 5 mm. long, covered with grey hairs. — Northwestern Sumatra — .....5. *P. capitata* (Miq.) Brem.
7. All flowers cymose. Bracts all ovate; those of the inner flowers shorter than the corolla. — Malay Peninsula and Sumatra — .....6. *P. sylvestris* Ridl.
: Flowers in the axils of the outer bracts in triads; in the axils of the inner ones solitary. Bracts oblong to spathulate, those on the main axis always longer than the corolla. — West Java — .....7. *P. pilosa* (Miq.) Brem.
8. Involucral bracts 4. Flowers pedicellate. — Malay Peninsula, Sumatra, Borneo — .....8. *P. rivularis* Hend.
: Involucral bracts 5. Flowers sessile.....9.

9. Leaves on the upper side glabrous. Tip of stipule bipartite. Inner bracts spathulate. — Sumatra — ..... 9. *P. scabiosiflora* Brem.
: Leaves on the upper side sparsely hirsute. Tip of stipule undivided. Inner bracts linear. — Batu Islands — ..... 10. *P. batuensis* Brem.

TAXONOMY[1]

Pomazota Ridl. in Trans. Linn. Soc. II, 3: 308. 1893; K. Schumann in Engl. & Prantl, Nat. Pflanzenfam., Nachtr. 1: 310. 1897; Ridl. in Fl. Mal. Pen. 2: 43. 1924; Lemée, Dict. Pl. Phan. 5: 502. 1934.

Coptophyllum Khs. in Ned. Kruidk. Arch. 2 (2): 161. 1851; Miq., Fl. Ned. Ind. 2: 175, 348. 1857, Suppl. 226. 1860, in Ann. Mus. Bot. Lugd.-Bat. 4: 230. 1869; Benth. & Hook. f., Gen. Pl. 2: 68. 1871; Boerl., Handl. Fl. Ned. Ind. 2 (1): 57. 1891; Ridl., Fl. Mal. Pen. 2: 43. 1923; Lemée, Dict. Pl. Phan. 2: 297. 1930; non *Coptophyllum* Gardner in Hook., Ic. Pl. 5: t. 477, 478. 1842.

Genus Rubiacearum Hedyotidearum, corollae tubo intus paulum infra orem annulo pilorum instructo, stylo antheras excedente, capsula globosa cum operculo dehiscente ad Klossiam Ridl. accedens, indumento hirsuto, staminibus dimidio inferiore tubi insertis, filamentis glabris, stigmatibus patentissimis, calyce cum operculo deciduo ab eo faciliter distinguendum.

Herbae e basi breviter repente ascendentes, simplices vel parce ramosae, raro post anthesin decumbentes et radicantes, semper pilis septatis plus minusve hirsutae. Caulis nunc monopodialis, casu quo inflorescentiae ramulos oppositos breves, ex internodio singulo constantes et foliis ad stipulas redactis instructos terminantes, nunc dichasialiter ramificatus vel sympodialis, casu quo inflorescentiis primum terminalibus, deinde in positionem lateralem coactis et inde ad nodos solitariis. Folia petiolata; superiora tamen interdum subsessilia; lamina tenuis vel raro rigidula, penninervia. Stipulae interpetiolares, ovatae, acuminatae, apice interdum bipartito, margine ciliato, persistentes. Inflorescentiae plerumque longius pedunculatae, raro subsessiles, nunc primum terminales et deinde a ramo axillari in positionem lateralem coactae vel, cum duo rami evolvuntur, in furcis ramorum remanentes, nunc ramulos abbreviatos axillares terminantes, casu quo plerumque oppositae et basi pedunculi semper squamis duabus stipulaceis instructae, capituliformes. Bracteae ciliatae, estipulatae, axilla glandulis aliquibus baculiformibus instructae; exteriores 4, 5 vel 8 aliis latiores, capitulum involucrantes; omnes fertiles et nunc cymas bi- vel uniparas vel triades, nunc flores singulos bibracteolatos suffulcientes. Flores sessiles vel breviter pedicellati, hermaphroditi, pentameri quanquam interdum cum aliquibus tetrameris vel hexameris mixti. Ovarium biloculare, placentis medio septo affixis, peltatis, ovulis numerosis. Calyx tubo plerumque brevi, lobis ovatis, ovato-lanceolatis, oblongis vel linearibus, margine ciliatis, alternantibus cum glandulis baculiformibus, fructu diu persistens, ultimo tamen cum operculo deciduus. Corolla alba, luteola vel carneola, hypocrateriformis, parva, tubo interdum paulum inflato, infra orem plus minusve annulatim constricto et ibidem intus annulo pilorum patentium instructo, ceterum glabro, lobis ovatis acutis, flore aperto patentibus, costa extus ciliatis. Stamina ad medium

[1] The abbreviations for the herbaria of the institutions cited in this paper are as follows: AA = Arnold Arboretum; BZ = Buitenzorg Botanic Garden; HBG = Inst. Allg. Bot., Hamburg; K = Royal Botanic Gardens, Kew; NY = New York Botanical Garden; U = Bot. Mus. Utrecht.

vel infra medium tubum inserta, filamentis glabris, antheris linearioblongis, subbasifixis, apiculatis, plerumque inclusis. Discus annularis, conicus vel cylindricus, glaber vel farinosus. Stylus apicem versus vix conspicue papillosus, ceterum glaber, tubo subaequilongus vel eo paulo longior; stigmata crassa et brevia, basi patentissima, apice paulum recurvata. Fructus capsula globosa, disco conspicue rostrata et calyce coronata, pariete tenui, ultimo dimidio superiore tabescens et partem apicalem cum calyce et disco operculi instar rejectans. Semina numerosa, rubro-brunnea, angulosa, alveolata, alveolis fundo granulatis.

Distributum speciebus adhuc notis 10 in Peninsula Malayana, Sumatra, Java, terra Borneënsi.

LECTOTYPUS: *P. capitata* (Miq.) Brem. n. comb. (*Coptophyllum* Miq.).

SERIES A. Sympodiales

Inflorescentiae primum terminales, plerumque mox a ramo axillari in positionem lateralem coactae, interdum, cum rami axillares duo evolvuntur, in furca ramorum remanentes. Pedunculus basi numquam squamis stipulaceis instructus. Flores axillis bractearum pro parte minime in cymas vel triades dispositi (in P. reptante interdum omnes singuli). Species 1–7.

a. Bracteae involucrantes 4.

α. Herba decumbens, foliis ovato-ellipticis vel ellipticis parvis, inflorescentia subsessili parva, ovario capsulaque glabris.

1. **Pomazota reptans** Backer in sched.; TYPUS: *Backer 31142* (BZ).

Herba ramosa, partibus apicalibus primum ascendentibus, usque ad 12 cm. altis, post anthesin decumbentibus et radicantibus. Caules 1.2 mm. diam., densius fusco-pubescentes, vivo rubri. Folia petiolo pubescente, 3–15 mm. longo, vivo rubro instructa; lamina elliptica vel ovato-elliptica, 2.5–4 cm. longa et 1.3–2.2 cm. lata, apice acuta vel breviter acuminata, basi acuta vel rotundata, casu quo prope petiolum contracta, sicc. supra saturate, subtus dilute brunnea, supra sparse fusco-hirsuta, subtus costa nervis venulis dense fusco-pubescens, margine ciliata, nervis utroque latere costae 7 vel 8, venulis paucis. Stipulae 4–5 mm. longae et 3–4 mm. latae, apice indivisae, margine ciliatae, ceterum glabrae. Inflorescentia subsessilis, a ramo axillari mox in positionem lateralem coacta, 8–12 mm. diam. Bracteae involucrantes 4, decussatae, ellipticae vel obovatae, 6–9 mm. longae et 4–6 mm. latae, margine ciliatae; bracteae interiores 2 vel 4, spathulatae, exterioribus aequilongae; omnes extus intusque fusco-hirsutae. Bracteae involucrantes plerumque pemptades vel triades, raro cymas ad flores duos vel singulos redactas suffulcientes, floribus ultimis pemptadum tamen plerumque rudimentariis; cymae in axillis bractearum interiorum semper ad flores duos vel ad florem singulum redactae. Bracteae florum lateralium pemptadum vel triadum spathulatae, basi conduplicatae, 4 mm. longae; bracteae florum sequentium et bracteolae florum singulorum eis angustiores, 2–2.5 mm. longae. Flores 5-meri. Ovarium glabrum. Calyx lobis ovatis, 0.7–1.3 mm. longis et 0.4–0.5 mm. latis, subobtusis, margine ciliatis sed ceterum glabris. Corolla alba tubo 3.5 mm. longo, 1.2 mm. infra orem annulo pilorum instructo, lobis 1–1.5 mm. longis. Stamina 0.5 mm. supra basin tubi inserta, filamentis 2.3 mm.,

antheris 0.8 mm. longis. Discus cylindricus, 0.5 mm. altus. Stylus 4 mm. longus. Capsula glabra, 1.5 mm. diam.

Hab. Sumatram Australem et Javam Occidentalem.

SUMATRA: Lampongs: G. Rate Telangaran, *Ibut 24* (BZ); G. Tanggamus, alt. 700 m., *de Voogd 161* (BZ). JAVA: Res. Buitenzorg: Lewiliang, alt. 500 m., *v. Steenis 2717* (BZ); G. Parungpung near Tjampea, alt. 750 m., *Bakhuizen v. d. Brink 4174* (BZ); ibid., *Bakhuizen v. d. Brink Jr. 610* (U); Kalapa Nunggal, alt. 200 m., *Backer 23381* (BZ); ibid., alt. 400 m., *Backer 5992* (BZ); ibid., alt. 500 m., *Backer 31142* (BZ, TYPUS).

Specimina sumatrana a me nondum visa fide *Backer* (in litteris) citata sunt.

β. Herba erecta, foliis lanceolato-ellipticis, supra scabridis, inflorescentia pedunculata, ovario capsulaque pilosis.

2. **Pomazota Vanleeuweni** Brem. n. spec.; TYPUS: *Docters v. Leeuwen 3276* (BZ).

Herba erecta, simplex, 5–7 cm. alta. Caulis densius pubescens, 2–2.5 mm. diam. Folia in petiolum dense pubescentem, 2–5 mm. longum contracta; lamina lanceolato-elliptica, 4–6 cm. longa et 1.6–2.7 cm. lata, apice acuta, basi contracta et plus minusve conduplicata, rigidula, sicc. supra saturate et subtus dilute brunnea, supra setulis minimis scabrida, subtus molliter pubescens, costa utrimque et nervis subtus dense pubescentibus, margine ciliolata, nervis utroque latere costae 10–13, venulis inconspicuis. Stipulae 8 mm. longae et 7 mm. latae, apice indivisae, extus dense pilosae, margine ciliatae. Inflorescentia distincte pedunculata; pedunculus dense pubescens, post anthesin usque ad 3.5 cm. accrescens. Bracteae extus dense, intus sparse pubescentes, margine pilis similibus ciliatae; bracteae involucrantes 4, decussatae, jugi primi ovatae, 12 mm. longae et 11 mm. latae, jugi secundo angustiores, omnes cymas 5-floras suffulcientes; bracteae interiores duae, triades suffulcientes; bracteae florum lateralium conduplicatae, bracteis involucrantibus paulo breviores; bracteae ultimae praecedentibus dimidio breviores. Flores 5-meri. Ovarium pilosum. Calyx lobis ovatis, 0.5 mm. longis et 0.7 mm. latis, subacutis, extus pilosis, margine pilis similibus ciliatis. Corolla alba dicta a me non visa. Discus cylindricus, 1 mm. altus. Capsula pilosa, 2 mm. diam.

Hab. Sumatram Orientalem.

SUMATRA: East Coast Gouvt: Haboko, in the forest between stones on the bank of a stream, *Docters v. Leeuwen 3276* (BZ, TYPUS, dupl. L.).

b. Bracteae involucrantes 8, liberae. Cymae decussatae.

3. **Pomazota simalurensis** Brem. n. spec.; TYPUS: *Achmad 516* (BZ).

Herba e basi breviter repente ascendens, pseudo-dichotome ramificata, 15–40 cm. alta. Caulis primum densius pubescens, internodiis bisulcatis, deinde plus minusve glabrescens et subteres, 2.5–4 mm. diam. Folia in petiolum pubescentem, usque ad 4 cm. longum contracta; petiolus foliorum superiorum tamen usque ad 8 mm. redactus; lamina lanceolata vel oblanceolata, 6–12 cm. longa et 2.5–4.5 cm. lata, apice acuminata, basi cuneata, supra sparse hirsuta, costa tamen densius pubescens, subtus costa nervis venulis pubescens, margine ciliata, sicc. supra saturate, subtus dilute brunnea, nervis utroque latere costae circ. 13, venulis paucis. Stipulae 14–16 mm. longae et 6–7 mm. latae, apice plerumque in dentes duas parallelas, usque ad 4 mm. longas exeuntes, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculatae; pedunculus dense hirsutus, ad anthesin circ. 1 cm. longus, postea usque ad 3 cm. accrescens; capitulum

2.5 cm. diam., post anthesin usque ad 3.5 cm. diam. accrescens. Bracteae involucrantes 8, quarum 4 majores triades breviter stipitatas suffulciunt; bracteae laterales triadum infimarum basi conduplicatae et torsae et inde in planum idem ut bractea triadem suffulciens expansae involucrum supplentes, bracteae involucrantes omnes liberae, spathulatae, ad medium plerumque contractae, extus basin versus pubescentes, margine ciliatae, majores 12 mm. longae et 5–6 mm. latae; bracteae interiores 4, ut bracteae involucrantes majores decussatae, flores singulos bibracteolatos suffulcientes; bracteolae ovatae, ovario paulo longiores. Flores 5-meri. Ovarium pilosum. Calyx lobis ovato-lanceolatis, 1.1 mm. longis et 0.5 mm. latis, extus sparse pilosis, margine ciliatis. Corolla matura nondum visa, colore ignoto. Stamina prope basin tubi inserta. Discus conicus, 0.5 mm. altus. Capsula pilosa.

Hab. insulam a Sumatra ad occasum Simalur sive Simeulowe dictam.

SIMALUR: s.l., *Achmad 516* (BZ, TYPUS, dupl. typi L).

c. Bracteae involucrantes 8, basi connatae. Cymae quaternae.

α. Bracteae cymarum primigenae basi utrimque lobo patente munitae. Calycis lobi minus quam 3 mm. longi, ferrugineo-hirsuti.

4. **Pomazota assimilis** Brem. n. spec.; TYPUS: *Loerzing 5880* (U).
Coptophyllum capitatum Miq. in errore apud Ridl. in Kew Bull. 1926: 68. 1926.

Herba e basi breviter repente ascendens, 13–20 cm. alta. Caulis simplex, primum dense ferrugineo-hirsutus, internodiis bisulcatis, deinde glabrescens et teres, 2.5–4 mm. diam. Folia in petiolum primum dense, deinde sparse hirsutum, 0.5–3.0 cm. longum contracta; lamina lanceolata vel oblanceolata, 7–13 cm. longa et 3.2–4.3 cm. lata, apice acuminata, basi acuta vel cuneata, supra sparse hirsuta, subtus costa nervis venulis principalibus densius ferrugineo-hirsuta, margine ciliata, sicc. supra olivaceo-brunnea, subtus dilute brunnea, nervis utroque latere costae 10–12, venulis paucis. Stipulae 10 mm. longae et 9 mm. latae, apice indivisae, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculatae; pedunculus subglaber, post anthesin circ. 3 cm. longus. Bracteae involucrantes 8, quarum 4 majores; omnes oblongae; majores 15–17 mm. longae et 4–5 mm. latae, ad medium interdum plus minusve constrictae; minores 10–12 mm. longae sed majoribus subaequilatae; omnes basi in receptaculum 7–10 mm. diam. connatae, apice subacutae, primum utrimque densius pubescentes. Flores omnes in dichasia densa dispositi; dichasia extus bracteis majoribus instructa; bracteae primigenae basi utroque latere lobo patente munitae, 13 mm. longae, lobo mediano 4 mm. lato, lobis lateralibus 3 mm. longis et 3 mm. latis; bracteae sequentes sensim minores, plerumque sine lobis lateralibus; bracteolae florum ultimorum flori aequilongae. Flores 5-meri. Ovarium dense pilosum. Calyx lobis lineari-oblongis, 2.7 mm. longis et 0.3–0.4 mm. latis, extus intusque pilis ferrugineis dense hirsutis. Corolla alba tubo 3 mm. longo, paulum inflato, 0.3 mm. infra orem annulo pilorum instructo, lobis 1 mm. longis. Stamina 0.7 mm. supra basin tubi inserta; filamenta 0.9 mm. longa; antherae 0.9 mm. longae. Discus annularis, 0.3 mm. altus. Stylus 3.5 mm. longus. Capsula 2 mm. diam., pilosa.

Hab. Sumatram et insulas a Sumatra ad occasum.

SUMATRA: East Coast Gouvt: S.E. of Sibolangit, alt. 650 m., *Loerzing 5880* (U, TYPUS); Lan Betimus, N.W. of Sibolangit, alt. 350 m., *Loerzing 5318* (U); Bukit

Pasang near Sibolangit, *Mandur Nur 7246* (K); Res. Tapanuli, Padang si Dempuan, *Rahmat 4854* (NY). Batu Islands: P. Batu, *Raap 655* (BZ); P. Masa, *Raap 169* (BZ). Mentawei Islands. Siberut, *Ibut 194* (BZ); *Boden Kloss 14517* (K).

β. Bracteae cymarum primigenae basi interdum uno sed numquam duobus lobis patentibus instructae. Calycis lobi plus quam 5 mm. longi, griseo-hirsuti.

5. **Pomazota capitata** (Miq.) Brem. n. comb.
Coptophyllum? capitatum Miq., Fl. Ind. Bat. 2: 348. 1857, Suppl. 216. 1860.
Coptophyllum capitatum Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 230. 1869; Boerl., Handl. Fl. Ned. Ind. 2 (1): 128. 1891; vix Ridl. in Fl. Mal. Pen. 2: 43. 1923, quae probabiliter est *P. rivularis* Hend., non Ridl. in Kew Bull. 1925: 89. 1925, quae est *P. rivularis* Hend., nec op. cit. 68. 1926, quae est *P. assimilis* Brem.

Herba e basi breviter repente ascendens, circ. 20 cm. alta. Caulis simplex, primum dense ferrugineo-hirsutus, internodiis bisulcatis, deinde glabrescens et teres, 2.5–5 mm. diam. Folia in petiolum primum dense, deinde sparse hirsutum, 1.5–3.5 cm. longum contracta; lamina lanceolata, 10–16 cm. longa et 3.5–5.5 cm. lata, apice acuminata, basi acuta vel cuneata, supra sparse hirsuta, subtus costa nervis venulis principalibus densius ferrugineo-pubescens, margine ciliata, sicc. supra saturatius, subtus dilute brunnea, nervis utroque latere costae 11–13, venulis paucis. Stipulae 12 mm. longae et usque ad 15 mm. latae, apice indivisae, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculatae; pedunculus subglaber, ante anthesin 1.5 cm. longus, postea usque ad 5 cm. accrescens. Bracteae involucrantes 8, quarum 4 majores, omnes oblongae; majores 20 mm. longae et 6–7 mm. latae; minores 15 mm. longae sed majoribus subaequilatae; omnes basi in receptaculum 10 mm. diam. connatae, apice subacutae, primum utrimque dense, deinde sparsius pubescentes. Flores omnes in dichasia densa dispositi; dichasia extus bracteis majoribus instructa; bracteae primigenae basi interdum lobo singulo munitae; bracteae sequentes floribus breviores; bracteolae florum ultimorum minimae. Flores 5- vel 6-meri. Ovarium dense pilosum. Calyx lobis linearibus, 5–5.5 mm. longis et 0.6–0.7 mm. latis, subobtusis, extus intusque pilis griseis dense hirsutis. Corolla colore ignoto, tubo 3 mm. longo, 0.5 mm. infra orem annulo pilorum instructo, lobis 1.5 mm. longis. Stamina 0.3 mm. supra basin tubi inserta, filamentis 1 mm., antheris 0.9 mm. longis. Discus conicus, 0.8 mm. altus. Stylus 3.0 mm. longus. Capsula 2.5 mm. diam., pilosa.

Hab. Sumatram Occidentalem.

Sumatra. Res. Tapanuli: mountain forest near Lumut, *Junghuhn s.n.* (L, U, typi).

d. Bracteae involucrantes 5.

α. Indumentum luteo-brunneum. Bracteae omnes ovatae; interiores floribus breviores.

6. **Pomazota sylvestris** Ridl. in Trans. Linn. Soc. II. 3: 308, f. 61. 1893, Fl. Mal. Pen. 2: 43. 1923.

Herba suberecta vel e basi breviter repente ascendens, 8–15 cm. alta. Caulis simplex, primum dense, postea sparsius pilis luteo-brunneis hirsutus, 2.5–4 mm. diam. Folia inferiora in petiolum dense hirsutum, usque ad 12 mm. longum contracta; superiora brevius petiolata vel subsessilia; lamina elliptico-lanceolata, 6–11 cm. longa et 2–4.7 cm. lata, apice acuta

vel breviter acuminata, basi acuta vel cuneata, utrimque sed praesertim margine, costa utrimque et nervis subtus pilis luteo-brunneis hirsuta, sicc. supra saturate et subtus dilute olivaceo-brunnea, nervis utroque latere costae 11–13, venulis paucis. Stipulae 12 mm. longae et 10 mm. latae, apice indivisae, extus hirsutae, margine ciliatae. Inflorescentiae pedunculatae; pedunculus hirsutus, ad anthesin circ. 1 cm. longus, deinde usque ad 5.5 cm. accrescens. Bracteae involucrales 5, ovatae, usque ad 15 mm. longae et 11 mm. latae, supra medium contractae, apice obtusae, subcarinatae, extus dense hirsutae, supra contractionem tamen costa margineque exceptis subglabrae; bracteae aliae sensim magnitudine descrescentes, ceterum maxime ut bracteae involucrales; interiores floribus multo breviores. Flores in axillis bractearum involucralium in cymas biparas, in axillis bractearum aliarum in cymas uniparas dispositi. Flores 5-meri, basi bracteae inserti. Ovarium dense pilosum. Calyx extus dense pilosus, tubo 0.3 mm. longo, lobis ovatis, 1 mm. longis et 0.7 mm. latis, margine ciliatis. Corolla alba, tubo 3.5 mm. longo, 0.5 mm. infra orem annulo pilorum munito, lobis 1.2 mm. longis. Stamina 0.8 mm. supra basin tubi inserta, filamentis 1.7 mm., antheris 1.2 mm. longis. Discus cylindricus, 1 mm. altus, farinosus. Stylus 3.5 mm. longus. Capsula pilosa.

Hab. Peninsulam Malayanam et Sumatram Septentrionalem.

MALAY PENINSULA: Pahang: Kota Tongkat, *Evans s.n.* (K, ex Fed. Mal. States Mus.), exemplum typi.

SUMATRA: East Coast Gouvt: Asahan, between H. Padang and Kopas, *Bartlett 6759* (NY); near Rantau Parapat, Bila, *Rahmat 2582*, *2715*, *3169* (NY); Tapanuli Res.: Padang si Dempuan, S. Manaun, *Rahmat 4516* (NY); near H. Imbaru, *Rahmat 4685* (NY); Sosopon on Aek si Olip, *Rahmat 5076* (NY).

β. Indumentum rubro-brunneum. Bracteae oblongae vel spathulatae, principales omnes floribus longiores.

7. Pomazota pilosa (Miq.) Brem. n. comb.

Coptophyllum pilosum Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 230. 1869; Boerl., Handl. Fl. Ned. Ind. 2 (1): 161. 1891; Koorders, Exkursionsfl. Java 3: 253. 1912. *Lasiagathis humilis* Bl. in schedula.

Herba suberecta vel e basi breviter repente ascendens, 7–21 cm. alta. Caulis simplex, raro semel pseudo-dichotome ramificatus, primum dense ferrugineo-pubescens, internodiis bisulcatis, deinde glabrescens et teres, 2–3 mm. diam. Folia in petiolum dense ferrugineo-pubescentem, 1.2–3 cm. longum contracta; lamina lanceolata, 6–14 cm. longa et 1.8–4.5 cm. lata, apice breviter acuminata, basi acuta vel cuneata, supra ferrugineo-hirsuta, costa utrimque et nervis subtus ferrugineo-pubescens, margine ciliata, sicc. supra saturatius, subtus dilute brunnea, interdum supra rubro-brunnea, nervis utroque latere costae circ. 11, venulis paucis. Stipulae 8–10 mm. longae et 4–6 mm. latae, apice indivisae, extus pubescentes, margine ciliatae. Inflorescentiae pedunculatae; pedunculus pubescens, ad anthesin circ. 0.5 cm. longus, postea usque ad 2.5 cm. accrescens. Bracteae involucrales 5, oblongae, 10–15 mm. longae et 6–8 mm. latae, supra medium paulum contractae, apice subacutae, fortiter carinatae, extus sparse pubescentes, intus glabrae, margine praesertim apicem versus ciliatae; bracteae aliae sensim magnitudine decrescentes, internae spathulatae, omnes margine ciliatae, floribus semper longiores, in rosulam densam dispositae. Flores in axillis bractearum involucralium in triades dispositi, in

axillis bractearum aliarum singuli; bracteae florum lateralium triadis parvae, calyce plerumque breviores. Flores 5-meri, in bracteam paulum egredientes. Ovarium sparse pilosum. Calyx extus sparse pilosus, tubo 0.5 mm. longo, lobis ovatis 0.7 mm. longis et 1 mm. latis, margine ciliatis. Corolla alba, tubo 3.8 mm. longo, 0.5 mm. infra orem annulo pilorum instructo, lobis 1.2 mm. longis. Stamina 1 mm. supra basin tubi inserta, filamentis 1.5 mm., antheris 1 mm. longis. Discus conicus, 0.6 mm. altus. Stylus 3.7 mm. longus. Capsula sparse pilosa.

Habitat Javam Occidentalem.

Java: Bantam Res.: Tjidjralang, *Kühl & v. Hasselt s.n.* (U) "Lasiagathis humilis" Bl. Buitenzorg Res.: G. Handjawung near Buitenzorg, *Backer 6051* (BZ); G. Butik Buligir near Buitenzorg, *Backer 10757* (BZ); Estate Nanggung near Buitenzorg, *Backer 10580* (BZ); Nirmala near Buitenzorg, *Backer 10757* (BZ); Pasir Kempul near Nirmala, *Backer 11075* (BZ); Java, s.l., *coll. ign. s.n.* (L, U, typi).

Series B. Monopodiales

Inflorescentiae ramulos axillares abbreviatos (ex internodio singulo cuius folia stipulis exceptis suppressa sunt constantes) terminantes et inde plerumque oppositae. Pedunculus basi semper squamis stipulaceis munitus. Flores in axillis bractearum semper solitarii. Species 8–10.

a. Bracteae involucrantes 4. Flores pedicellati.

8. **Pomazota rivularis** Hend. in Gard. Bull. Straits Settl. 4: 411, f. 1–3. 1929; Merr. in Papers Mich. Acad. Sci. 23: 193. 1938.

Pomazota involucrata Merr. in Mitt. Inst. Bot. Hamb. 7: 274. 1937.

Coptophyllum bracteatum Khs. in Ned. Kruidk. Arch. 2 (2): 161. 1851; Miq., Fl. Ind. Bat. 2: 175. 1856, absentia typi haud certe sciendum.

?*Coptophyllum capitatum* Miq. apud Ridl., Fl. Mal. Pen. 2: 43. 1923, non Miq., Ind. Bat. 2: 348. 1857.

Coptophyllum capitatum Miq. in errore apud Ridl. in Kew Bull. 1925: 84. 1925.

Herba e basi repente ascendens, 12–20 cm. alta. Caulis simplex, primum sparse hirsutus, internodiis bisulcatis, 2 mm. diam., mox glabrescens et ad 5 mm. diam. accrescens. Folia in petiolum sparse hirsutum, 2–3 cm. longum contracta; lamina oblanceolata, 11–18 cm. longa et 4–6.5 cm. lata, apice acuminata, basi cuneata, sicc. supra olivacea, subtus dilute brunnea, supra sparse hirsuta, costa utrimque, nervis venulisque subtus densius pubescens, margine ciliata, nervis utroque latere costae 14 vel 15, venulis paucis. Stipulae 13 mm. longae et 9 mm. latae, apice indivisae, margine ciliatae, extus nervis hirsutae. Inflorescentiae pedunculatae; pedunculus gracilis, sparse hirtellus, post anthesin usque ad 8 cm. accrescens, basi squamis stipularibus 7 mm. longis instructus; capitulum 3 cm. diam. Bracteae involucrales 4 ovato-oblongae, 9–15 mm. longae et 5–12 mm. latae, subobtusae, margine et costa ciliatae; bracteae aliae praesertim centrum versus multo angustiores, spathulatae; internae 8 mm. longae et 1.6 mm. latae, utrimque longe et densius hirsutae. Flores in axillis bractearum semper solitarii, in bractea 0.5 mm. egredientes, pedicellati, basi pedicelli bracteolis duabus lineari-spathulatis, 3–5 mm. longis et 0.3–0.5 mm. latis, basi conduplicatis, utrimque hirsutis instructi; pedicellus 0.3–1.8 mm. longus. Flores 5-meri, aliqui interdum 4-meri. Ovarium glabrum. Calyx tubo 0.2 mm. longo, lobis oblongis, 2.0 mm. longis et 0.4 mm. latis, ciliatis et utrimque sed praesertim intus sparse hirsutis. Corolla alba vel carneola, tubo 3.4–4.0 mm. longo, 0.6 mm. infra orem annulo pilorum

instructo, lobis 1 mm. longis. Stamina 0.5 mm. supra basin tubi inserta, filamentis 0.5–0.7 mm., antheris 0.7–1.0 mm. longis. Discus 0.5 mm. altus, post anthesin usque ad 1 mm. accrescens. Stylus 3.8 mm. longus. Capsula 2 mm. diam., glabra.

Hab. Peninsulam Malayanam, Sumatram, terrae Borneënsis partem occidentalem.

MALAY PENINSULA: Johore: G. Muntahok, alt. 200 m., *Holttum 19922* (BZ) (ex herb. Sing.); Ulu Kabang, alt. 75 m., *Holttum 10869* (BZ) (ex herb. Sing.); S. Susur Rotan, *Corner s.n.* (BZ) (ex herb. Sing.).

SUMATRA: East Coast Gouvt: Asahan, Aek Munte, alt. 500 m., *Rahmat 9303* (AA); Tomuan Dolok, alt. 1000 m., *Rahmat 9837* (AA); H. Bagasan, *Rahmat 6748, 6800* (AA); West Coast Res.: Padang, S. Bulu, *Beccari 922* (K); Benkulen Res.: s.l. *Brooks s.n.* (K, *C. capitatum* Miq. apud Ridl.). BORNEO: Sarawak: Mt. Matang, *Ridley 11754* (K); Bidi, *Ridley 11752* (K); Western Division: upper S. Serawai, alt. 450 m., *H. Winkler 838* (HBG, TYPE of *P. involucrata* Merr.).

As one of the specimens collected in the Malay Peninsula was distributed by the Singapore Herbarium under the name *Coptophyllum capitatum*, it seems probable that the *C. capitatum* of Ridley's "Flora of the Malay Peninsula" represents the species dealt with above.

Henderson, l.c., described the flowers as 4-merous, but the large majority is 5-merous. As Merrill separated his *P. involucrata* from *P. rivularis*, of which he had apparently seen no specimens, mainly on account of the 5-merous flowers, this species can not be kept up.

b. Bracteae involucrantes 5. Flores sessiles.

a. Folia supra glabra. Stipulae apice bipartito. Bracteae interiores spathulatae.

9. **Pomazota scabiosiflora** Brem. n. spec.; TYPUS: *Bünnemeyer 493* (BZ)

Herba e basi breviter repente ascendens, circ. 20 cm. alta. Caulis simplex, primum sparse ferrugineo-pubescens, internodiis bisulcatis, 2.2 mm. diam., deinde glabrescens et teres. Folia in petiolum primum breviter ciliatum, 1–2 cm. longum contracta; lamina oblanceolata vel anguste oblonga, 12–18 cm. longa et 3.5–5.5 cm. lata, apice acuta vel acuminata, basi cuneata, sicc. supra saturate, subtus dilute brunnea, supra glabra, subtus costa nervis venulis pilis ferrugineis primum dense, deinde sparse pubescens, margine primum ciliolata, postea subglabra, nervis utroque latere costae 13 vel 14, venulis paucis. Stipulae 15 mm. longae et 7 mm. latae, apice bipartito, margine primum ciliolatae, deinde glabrescentes. Inflorescentiae pedunculatae; pedunculus glaber, ante anthesin circ. 1 cm. longus, postea usque ad 6.5 cm. accrescens, basi squamis stipularibus 6.8 mm. longis instructus; capitulum usque ad 4 cm. diam. Bracteae involucrales 5, oblongae, 15–20 mm. longae et 5.5–8 mm. latae, subobtusae, basi vix conspicue et apicem versus distincte ciliatae; bracteae aliae spathulatae, magnitudine sensim decrescentes; centrales 6 mm. longae et 2 mm. latae, margine ciliatae, ceterum glabrae. Flores in axillis bractearum semper solitarii, in bracteam circ. 1 mm. egredientes, sessiles, basi bracteolis duabus oblanceolatis, 3 mm. longis et 1 mm. latis, basi conduplicatis, ciliatis instructi. Flores 5-meri. Ovarium glabrum. Calyx tubo 0.3 mm. longo, lobis oblongis, 2.2 mm. longis et 0.4 mm. latis, ciliatis. Corolla luteola, tubo 2.5 mm. longo, 0.2 mm. infra orem annulo pilorum instructo,

lobis 1.5 mm. longis. Stamina 0.5 mm. supra basin tubi inserta, filamentis 1.5 mm., antheris 1 mm. longis, maxima parte exsertis. Discus conicus, 0.6 mm. altus. Stylus 3.3 mm. longus. Capsula 1.7 mm. diam., glabra.

Hab. Sumatram Occidentalem.

SUMATRA: West Coast Res.: N.W. slopes of G. Talamau, alt. 750 m., *Bünnemeyer 493* (BZ, TYPUS).

β. Folia supra sparse hirsuta. Stipulae apice indivisae. Bracteae interiores lineares.

10. **Pomazota batuensis** Brem. n. spec.; TYPUS: *Raap 701* (BZ).

Herba e basi breviter repente ascendens, 8–15 cm. alta. Caulis simplex, primum densius hirsutus, internodiis bisulcatis, deinde sparse hirsutus et subteres. Folia in petiolum densius hirsutum, 8–15 mm. longum contracta; lamina oblanceolata, 4.5–11.5 cm. longa et 2.0–4.5 cm. lata, apice acuminata, basi cuneata, sicc. utrimque dilute brunnea, supra sparse hirsuta, subtus sparse pubescens, costa utrimque nervis venulisque subtus densius pubescens, margine ciliata, nervis utroque latere costae 10–12, venulis paucis. Stipulae 10 mm. longae et 6 mm. latae, apice indivisae, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculatae; pedunculus primum densius, postea sparsius hirtellus, post anthesin usque ad 3 cm. accrescens, basi squamis stipularibus instructus; capitulum usque ad 2.7 cm. diam. Bracteae involucrales 5, oblongae, 12–15 mm. longae et 4–6 mm. latae, subacutae, margine ciliatae, ceterum glabrae; bracteae aliae magnitudine sensim decrescentes; centrales lineares, 5–9 mm. longae et 0.5–0.9 mm. latae. Flores in axillis bractearum semper solitarii, in bracteam circ. 1 mm. egredientes, sessiles, basi bracteolis duabus linearibus, 4.5 mm. longis et 0.4 mm. latis, ciliatis instructi. Flores 5-meri. Ovarium glabrum. Calyx tubo 0.1 mm. longo, lobis oblongis 2–3 mm. longis et 0.3–0.4 mm. latis, ciliatis. Corolla colore ignoto, matura nondum visa. Stamina prope basin tubi inserta. Capsula 1.8 mm. diam., glabra.

Hab. insulas a Sumatra ad occasum, Batu dictas.

BATU ISLANDS: P. Batu, *Raap 701* BZ., typus.

INDEX SPECIERUM

4. *assimilis* Brem. n. spec. — Sumatra et insulis a Sumatra ad occasum.
10. *batuensis* Brem. n. spec. — insulis a Sumatra ad occasum.
bracteata (Khs.) Brem. n. comb. (*Coptophyllum* Khs.), spec. non satis nota — Sumatra.
5. *capitata* (Miq.) Brem. n. comb. (*Coptophyllum* Miq.) — Sumatra.
7. *pilosa* (Miq.) Brem. n. comb. (*Coptophyllum* Miq.) — Java Occidentali.
1. *reptans* Backer ex Brem. n. spec. — Sumatra Australi et Java Occidentali.
8. *rivularis* Hend. — Peninsula Malayana, Sumatra, terra Borneënsi.
9. *scabiosiflora* Brem. n. spec. — Sumatra Occidentali.
3. *simalurensis* Brem. n. spec. — insula a Sumatra ad occasum Simalur dicta.
6. *sylvestris* Ridl. — Peninsula Malayana, Sumatra.
2. *Vanleeuweni* Brem. n. spec. — Sumatra Orientali.

ZEIST,
HOLLAND.

SIDEROBOMBYX BREM. NOV. GEN. RUBIACEARUM HEDYOTIDEARUM

C. E. B. BREMEKAMP

The Bornean plant to be described below as the type of a new genus, resembles in general aspect the species of *Pomazota* Ridl., series *Sympodiales* Brem., but has the silky reddish brown pubescence, the subcapitate didymous stigma and exsuccous dipyrenous drupes of *Xanthophytum* Reinw. ex Bl. It differs from the latter and from the nearly related and perhaps not sufficiently distinct genera *Paedicalyx* Pierre ex Pitard and *Xanthophytopsis* Pitard in the position of the inflorescences, which are not opposite, but at first terminal and afterwards solitary at the nodes, the presence of two large involucral bracts, and also in the floral structure: in the only specimen known so far the style is exserted and the stamens included, whereas in *Xanthophytum* the anthers are apparently always exserted and the style included. From *Pomazota* it differs not only in the nature of the indumentum, in the subcapitate didymous stigma and exsuccous dipyrenous drupes, but also in the nature of the involucre, which consists of two very wide reniform bracts instead of 4, 5 or 8 much narrower ones, and in the inside villous upper half of the corolla-tube.

The resemblance with *Keenania* Hook. f., *Campanocalyx* Val., *Myrioneuron* R.Br., *Polysolenia* Hook. f. and *Leptomischus* Drake is perhaps of greater importance than that with *Pomazota* Ridl. or *Xanthophytum* Reinw. ex Bl. In all these genera the inflorescences are terminal and capituliform, the corolla-tube is villous inside in the upper half, and the flowers are apparently everywhere dimorphic. As the new genus is based on a single specimen, the conclusion that the latter represents the long-styled form of a heterostylous species rests on the resemblance between its flowers and the long-styled ones found in the other genera. At first I was inclined to regard the flowers of the type specimen of my new genus not only as long-styled but also, like those of *Keenania,* as female, because the pollen grains are uncommonly small and thin-walled, but since I have found similar pollen in short-styled flowers of *Myrioneuron* and also in *Xanthophytum,* I have dropped this supposition.

The new genus differs from *Myrioneuron* in the presence of two large involucral bracts and in the nature of the pyrenes, which are apparently indehiscent, from *Keenania* and *Campanocalyx* in the narrowness of the calyx-lobes, from *Polysolenia* in the entire stipules and from *Leptomischus* in the dipyrenous drupes.

Siderobombyx Brem. n. gen.

Rubiacearum Hedyotidearum sensu meo, inflorescentiis primum ter-

minalibus, capituliformibus, corollae tubo intus dimidio superiore villoso, et probabiliter floribus heterostylis ad genera *Keenaniam* Hook. f., *Campanocalycem* Val., *Myrioneurum* R. Br., *Polysoleniam* Hook. f., *Leptomischum* Drake accedens, sed ad eis stigmate subcapitato didymo, insuper a *Keenania* calycis lobis haud imbricatis, a *Campanocalyce* calyce non campanulato, a *Myrioneuro* pyrenis non dehiscentibus et bracteis involucralibus magnis, a *Polysolenia* stipulis indivisis, a *Leptomischo* fructu non opercule dehiscente sed dipyreno distinguendum.

Herba caule sympodiali simplici crassiore. Folia in petiolum satis longum contracta; lamina satis magna, tenuis, subtus primum indumento rubro-brunneo sericeo vestita, penninervia. Stipulae interpetiolares, ovatae acuminatae, indivisae, magnae, persistentes. Inflorescentiae primum terminales, deinde a ramo axillari in positionem lateralem coactae et solitariae ad nodos, pedunculatae, capituliformes, involucratae. Involucrum e bracteis duabus externis magnis, reniformibus et pluribus bracteis internis brevioribus et forma ovatis, oblongis vel oblanceolatis compositum. Flores centro capituli dichasialiter dispositi, bracteis corolla brevioribus suffulti, sessiles, 5-meri, hermaphroditi, probabiliter heterostyli. Ovarium biloculare, placentis peltatis oblongis medio septo stipite brevi affixis, ovulis numerosis. Calyx tubo brevi, lobis lanceolatis acutis, extus dense rubro-brunneo villosis alternantibus cum glandulis baculiformibus. Corolla alba, hypocrateriformis, tubo intus dimidio superiore dense villoso, lobis ovatis acutis, flore aperto patentibus, extus costa sparse pilosis. Stamina in flore longistylo fere ad medium tubum inserta, filamentis glabris brevissimis, antheris subbasifixis, lineari-oblongis, in apiculum longum productis, inclusis. Discus annularis. Stylus glaber in flore longistylo, parte superiore impressionibus antherarum striatus, stigmate capitato didymo. Fructus drupa exsucca dipyrena, calyce persistente coronata, pyrenae ambitu oblongae, osseae, non dehiscentes. Semina rubro-brunnea, angulata, alveolata, alveolis fundo granulatis.

Genus adhuc monotypicum parte septentrionali terrae Borneënsis endemicum.

Species unica: *S. kinabaluensis* Brem. n. spec.

Siderobombyx kinabaluensis Brem. n. spec.; TYPUS: *J. & M. S. Clemens 31540* (BZ).

Herba circ. 45 cm. alta. Caulis primum pilis tenuibus rubro-brunneo-villosus, internodiis bisulcatis, deinde glabrescens et teres, 4 mm. diam. Folia in petiolum primum pilis rubro-brunneis densius villosum, deinde glabrescentem, usque ad 4.5 cm. longum contracta; lamina obovata, 22–27 cm. longa et 8–11 cm. lata, apice acuminata, basi sensim contracta, supra primum sparse pilosa, deinde glabrescens, subtus pilis rubro-brunneis primum dense sericeo-villosus, deinde sparse et vix conspicue pubescens, sicc. supra saturate et subtus dilute brunnea, nervis utroque latere costae 12–13, venulis paucis. Stipulae usque ad 1.8 cm. longae et 1.3 cm. latae, apice indivisae, extus sparse pubescentes, margine densius ciliatae. Inflorescentiae breviter pedunculatae; pedunculus circ. 1.3 cm. longus. Bracteae involucrantes externae 2.5 cm. latae et 1.8 cm. longae, acuminatae; bracteae involucrantes internae satis numerosae, breviores et multo angustiores, ovatae, oblongae et oblanceolatae, ciliatae, omnes steriles. Bracteae fertiles bracteis involucrantibus intimis similiores. Flores later-

ales dichasiorum bracteis lanceolatis quam floribus brevioribus, extus et praesertim margine pilis rubro-brunneis dense villosis suffulti. Ovarium pilis rubro-brunneis dense villosum, 2 mm. longum et 1 mm. diam. Calyx pilis rubro-brunneis extus dense villosus, intus subglaber, tubo 1 mm. alto, lobis lanceolatis 4 mm. longis et 1.3 mm. latis, acutis. Corolla tubo 5 mm. longo, extus pilis rubro-brunneis sparse villoso, intus dimidio superiore dense albo-villoso, lobis 1 mm. longis, costa parce villosis. Stamina in flore longistylo 2 mm. supra basin tubi inserta, filamentis glabris 0.6 mm. longis, antheris longe apiculatis 1.2 mm. longis. Discus 0.3 mm. altus, 1 mm. diam. Stylus in flore longistylo 6 mm. longus. Drupa 3 mm. alta, 2 mm. lata, 1 mm. crassa, didyma, pilis rubro-brunneis sparse villosa.

Hab. terrae Borneënsis partem septentrionalem.

Borneo. British North Borneo, Mt. Kinabalu, Penibukan, alt. 1200–1500 m., *J. & M. S. Clemens 31540* (BZ).

On one of the two labels attached to the specimen the height is given as 18 feet, but on the other, which is apparently the original one, as 18 inches (18″). As its nearest allies are all comparatively low plants with, as a rule, unbranched stems, I have assumed that the latter is right, and that the preserved shoot represents the whole plant, the roots only excepted.

Zeist,
Holland.

THE CYPERACEAE COLLECTED IN NEW GUINEA BY L. J. BRASS, II.*

S. T. Blake

With two plates and one text-figure

This paper deals with the genera of the Mapanioideae and most of those of the Scirpoideae. Several collections had previously been examined by Kükenthal, Uittien or Svenson and reference to their determinations is made in the citation of specimens. The treatment of *Cyperus* follows that of Kükenthal in Pflanzenr. 101 (IV. 20) : 1935–6.

Hypolytrum L. C. Richard

Hypolytrum compactum Nees in Linnaea 9: 288. 1835, *nomen*, in Nov. Act. Acad. Caes. Leop. Natur. Cur. 16, suppl. 2: 73. 1843; Kükenth. in Engl. Bot. Jahrb. 59: 53. 1925; 69: 261. 1938; Uitt. in Rec. Trav. Bot. Néerl. 33: 155. 1936, in Meded. Bot. Mus. Herb. Univ. Utrecht 26: 155. 1936; Ohwi in Bot. Mag. Tokyo 56: 209. 1942.

Papua: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7457*, August 1936, plentiful as scattered ground cover in poorer types of soil (det. Uittien).

New for Papua; previously known from Netherlands New Guinea, North-East New Guinea, Aru Islands, Celebes, Borneo, Philippine Islands and Indo-China.

Hypolytrum scabrum Uitt. in Jour. Arnold Arb. 20: 215. 1939.

Papua: Western Division: Oroville Camp, Fly R., *Brass 7398* (type coll.), Aug. 1936, common plant sporadic in tufts on forest floor. Central Division: Mekeo District, *C. T. White 806*, July-August 1918.

White 806 is in rather young flower only; it has a more ample inflorescence than the type-collection, the colour throughout is paler and the mottling on the leaves is very indistinct. A similar indistinct mottling has been noticed on some specimens of *H. latifolium*.

Hypolytrum latifolium L. C. Rich. in Pers. Syn. 1: 70. 1805; F. Muell. Pap. Pl. 2: 34. 1886; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 191. 1900; Valck. Suring. in Nova Guin. Bot. 8: 709. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 53. 1924; 69: 260. 1938.

Netherlands New Guinea: Bernhard Camp, Idenburg R., *Brass 13974*, April 1939, alt. 50 m., common in semi-swampy rain-forest of river plains (clumps ± 1 m. high). Papua: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7553*, August 1936, rain-forest, common undergrowth in damp soil near lake (det. Uittien). Central Division: Kanosia, *Carr 11302*, Feb. 1935, sea-level, marshy forest (ca. 3 ft. tall) (herb. Canberra). Without definite locality, *W. E. Armit, Barton*.

Solomon Islands: Bougainville: Marmaromino, *Kajewski 2188*, Sept. 1930, alt. 50 m., rain-forest, common (a rush growing in swampy places up to 1¾ m. high,

* Botanical Results of the Richard Archbold Expeditions. See Jour. Arnold Arb. 28: 99–116. 1947.

leaves bright green. San Cristobal: Hinuahaoro, *Brass 3044*, Sept. 1932, alt. 900 m., forest floor. Common name: Ti-pi-rekio).

The species ranges from India through Malaysia to Queensland, though the above appears to be the first definite record from Netherlands New Guinea (unless *H. amplectens* Valck. Suring., op. cit., 708, t. 115, be conspecific) and Bougainville.

Kükenthal in 1938, l.c., cites *Carr 12010* as belonging to this species, but I am doubtful of this determination. The specimen seen is very slender with narrow leaves and the lower glumes are longer, narrow, and acute; the spikelets are very young.

Concerning the legitimacy of the name, see S. T. Blake in Proc. Roy. Soc. Queensl. 54: 71. 1943.

Thoracostachyum Kurz

Thoracostachyum bancanum (Miq.) Kurz in Jour. As. Soc. Bengal 38 (2): 76. 1869; Uitt. in Rec. Trav. Bot. Néerl. 33: 136. 1936, in Meded. Bot. Mus. Herb. Univ. Utrecht 26: 136. 1936, with synonymy; Ohwi in Bot. Mag. Tokyo 56: 210. 1942.

Lepironia bancana Miq. Fl. Ind. Bat. Suppl. 1: 604. 1860.

Thoracostachyum subcapitatum Valck. Suring. in Nova Guin. Bot. 8: 710, t. 107. 1912.

PAPUA: Western Division: Palmer R., 2 miles below junction with Black R., *Brass 7096*, June 1936, alt. 100 m., forming open tufted ground cover in special swamp forests on ridges; same place and date, *Brass 7097*, plentiful as ground cover in swamp forests on low plateaus.

Rather widely spread through Malaya, Sumatra and Borneo. In New Guinea it was previously known only from Netherlands New Guinea.

Of the two collections cited above *Brass 7096* is in young flower and his *7097* has mature fruit. Both were determined by Uittien.

Thoracostachyum pandanophyllum (F. Muell.) Domin in Biblioth. Bot. 85: 484. 1915; Uitt. in Rec. Trav. Bot. Néerl. 33: 138. 1936, in Meded. Bot. Mus. Herb. Univ. Utrecht 26: 138. 1936, with synonymy.

Hypolytrum pandanophyllum F. Muell. Fragm. Phytogr. Austr. 9: 16. 1875.

Mapania pandanophyllum (F. Muell.) K. Schum. in K. Schum. & Hollr. Fl. Kaiser Wilhelmsl. 25. 1889; in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 189. 1900.

Thoracostachyum hypolytroides (F. Muell.) C. B. Clarke in Hook. f. Fl. Brit. Ind. 6: 681. 1894; Valck. Suring. in Nova Guin. Bot. 8: 710. 1912; Rendle in Gibbs, Fl. Arfak Mts. 250. 1917; Kükenth. in Engl. Bot. Jahrb. 59: 54. 1924.

PAPUA: Western Division: Strickland R., *W. Bäuerlen* in 1885; Lake Daviumbu, Middle Fly R., *Brass 7634*, Sept. 1936, one of the principal plants of the floating islands in lake; same locality *Brass 7917*, Sept. 1936, abundant on floating islands of lake and forming characteristic undergrowth of sago and *Melaleuca* swamp forests (leaves erect to 3 m.; inflorescence pale pink, shorter than the leaves); Lower Fly R., east bank opposite Sturt Island, *Brass 8118*, October 1936, forming characteristic undergrowth of *Erythrina* swamp forests (clumps 2.5–3 m. high, leaves erect).

New for Papua; previously known from Malaya, Sumatra, Borneo, Celebes, Palau Islands, Netherlands and North-East New Guinea, and NE. Queensland. All Brass's specimens had been previously determined by Uittien.

Paramapania Uittien

Paramapania simplex (Ridl.) Uitt. in Rec. Trav. Bot. Néerl. 32: 190. 1935, in Meded. Bot. Mus. Herb. Univ. Utrecht 16: 190. 1935.

Thoracostachyum simplex Ridl. in Trans. Linn. Soc. II, Bot. 9: 244. 1916.

Netherlands New Guinea: 4 km. SW. of Bernhard Camp, Idenburg R., *Brass 13481,* March 1939, alt. 850 m., tufted in semishade of flood-swept river banks in rain-forest; 4 km. SW. of Bernhard Camp, Idenburg R., *Brass 13601*, March 1939, alt. 850 m., occasional tufts, slopes of rain-forest ravines. Papua: Western Division: Fly R., 528-mile Camp, *Brass 6647*, May 1936, alt. 80 m., very common little floor plant scattered through the ridge forests (det. Uittien).

New for Papua; previously known only from the type collection from the Snow Range, Netherlands New Guinea. *Brass 6647* is much smaller than the others (the largest leaf seen being only 13 cm. long and 1 cm. wide) with small spikelets about 6 × 4 mm., and somewhat smaller nuts.

Paramapania parvibractea (C. B. Clarke) Uitt. in Rec. Trav. Bot. Néerl. 33: 143. 1936, in Meded. Bot. Mus. Herb. Univ. Utrecht 26: 143. 1936.

Hypolytrum parvibractea C. B. Clarke in Kew Bull. 1899: 114. 1899.

Hypolytrum parvibracteatum C. B. Clarke in Kew Bull. Add. Ser. 8: 51. 1908; Valck. Suring. in Nova Guin. Bot. 8: 709. 1912; Ridl. in Trans. Linn. Soc. II, Bot. 9: 243. 1916.

Hypolytrum parvibracteatum var. *quadriglumatum* Valck. Suring., l.c., and *t. 116.* 1912.

Hypolytrum quadriglumatum Suring., l.c., 709. 1912 (*nomen invalidum*?).

Mapania montana Lauterb. & K. Schum. in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 189. 1900.

Thoracostachyum montanum (Lauterb. & K. Schum.) Valck. Suring. in Nova Guin. Bot. 8: 710. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 54. 1924; Ohwi in Bot. Mag. Tokyo 56: 209. 1942.

Thoracostachyum parvibractea (C. B. Clarke) Kükenth. in Engl. Bot. Jahrb. 69: 261. 1938 (*nomen vix validum*).

Paramapania amboinensis Uitt. in Rec. Trav. Bot. Néerl. 32: 191. 1935, in Meded. Bot. Mus. Herb. Univ. Utrecht 16: 191, fig. 4. 1935.

Paramapania montana (Lauterb. & K. Schum.) Uitt. in Rec. Trav. Bot. Néerl. 32: 200. 1935, in Meded. Bot. Mus. Herb. Univ. Utrecht 17: 200. 1935 (*nomen provisorium*).

Netherlands New Guinea: East slopes of Cyclops Mountains, *Brass 8944*, 1938, alt. 575 m., occasional floor plant in tall forest (inflorescence purple); Bernhard Camp, Idenburg R., *Brass 13842*, April 1939, alt. 150 m., frequent tufts in rain-forest of lower mountain slopes. Papua: Central Division: Dieni, Ononge Road, *Brass 3931*, April-May 1933, alt. 500 m., sporadic occurrence on rain forest floor.

Evidently widely spread in New Guinea and has been found in the Moluccas and Celebes (Uittien, ll.cc.).

Some of the names cited in the synonymy have doubtful nomenclatural status. *Hypolytrum quadriglumatum* Valck. Suring. was published as follows:

"**Hypolytrum parvibracteatum** Clarke var. **quadriglumatum**; nov. var., nisi **H. quadriglumatum** species nova."

"Tab. CXVI"

In the explanation of the plate only the ternary combination appears. The binomial *H. quadriglumatum* might be taken as an alternative name,

but because of the use of the word *nisi* (as well as the absence of the binomial from the explanation of the plate) there is at least the possibility that the name should be regarded as a provisional name and therefore invalid.

Paramapania montana (Lauterb. & K. Schum.) Uitt. also seems to be a provisional name ["If it (i.e. *Thoracostachyum montanum*) turns out to be the same species, the name of the latter (i.e. *Paramapania amboinensis*) should be altered in *P. montana* Uitt."].

And finally the combination *Thoracostachyum parvibractea* (C. B. Clarke) Kükenth. does not seem to satisfy the requirements of Art. 44. The name was published as follows: "Th. parvibractea (C. B. Clarke) Kükenth. comb. nov. — *Th. montanum* Suringar."

There is nothing in the citation to show upon what species of Clarke's Kükenthal based his new combination, though it may be presumed it was *Hypolytrum parvibractea*. The citation of *Th. montanum* Valckenier Suringar and reference to the (much later) work of Uittien leads one to this presumption, but it is no proof.

Paramapania attenuata sp. nov. PLATE I.

Rhizoma lignosum obliquum, circa 5 mm. crassum, fibrillis tectum. Folia equitantia, anguste linearia, basin versus angustata et complicata, in apicem filiformem curvum vel flexuosum longe acutata, 30 usque plus 50 cm. longa, circa 4 mm. lata, coriacea, pallide viridia, plurinervia nervis prominulis mediano subtus distinctissimo, sursum carina marginibusque scabra, apice scaberrima. Scapi 10–20 cm. longi, subtrigono-filiformes, 0.3–0.6 mm. crassi, flaccidi, laeves, glabri, basi vaginis angustis sanguineo-fuscis praediti, prope medium vaginam unicam breviter laminiferam pro more gerentes, 1- vel usque 4-stachyi quo in casu ramuli usque ad 13 mm. longi adsunt. Spiculae brunneae 8–10 mm. longae, sub anthesi 3.5 et sub fructu 5 mm. latae. Glumae 3 mm. longae, suboblongae, apice late rotundatae. Flores 2.5–2.8 mm. longae. Squamulae 5. Stigmata 3. Nux ambitu lanceolata longe acuteque acuminato-rostrata, stipitata, trigona, 6 mm. longa, 1 mm. lata, nitide fusca in rostrum curvum paullo pallidius sensim abeuns; stipes alulatus 1 mm. longus.

NETHERLANDS NEW GUINEA: 6 km. SW. of Bernhard Camp, Idenburg R., *Brass 12930*, (TYPE), Feb. 1939, alt. 1200 m., frequent along crests of ridges in rain-forest.

This new species is most nearly allied to *P. longirostris* (Kükenth.) Uitt. but differs in that the glumes are twice as long, the flowers slightly smaller than the glumes, in the indistinctly 3-angled (not 6-angled) nut passing gradually (not abruptly) into the relatively shorter beak. Of the seven scapes on the type material, 3 have each a single spikelet, 2 have 2 each, and 2 have 4 each.

Mapania Aublet

Subgenus Pandanoscirpus Uittien

Mapania papuana Ridl. in Trans. Linn. Soc. London II, Bot. 9: 246. 1916, Uitt. in Rec. Trav. Bot. Néerl. 33: 151. 1936, in Meded. Bot. Mus. Herb. Univ. Utrecht 26: 151. 1936.

NETHERLANDS NEW GUINEA: 4 km. SW. of Bernhard Camp, Idenburg R., *Brass 13097*, March 1939, alt. 900 m., abundant in mossy-forest undergrowth (stem up to 40 cm. long and plant ± 1.5 m. overall; fruits yellow, fleshy).

As yet known only from Netherlands New Guinea.

Mapania baccifera C. B. Clarke in Kew Bull. Add. Ser. 8: 53. 1908; Uitt. in Rec. Trav. Bot. Néerl. 33: 279. 1936, in Meded. Bot. Mus. Herb. Univ. Utrecht 32: 279. 1936.

SOLOMON ISLANDS: Isabel: Tiratona, *Brass 3219*, Nov. 1932, alt. 600 m., common floor plant in mountain forests (fruit yellow; common name "sesala").

Originally described from an inflorescence and a fragment of a leaf collected by Guppy on Shortland Island (Solomon Islands) and somewhat tentatively assigned to sect. (subg.) *Halostemma*. Uittien ll.cc., records it from Netherlands New Guinea and refers it to subgen. *Pandanoscirpus*. Brass's specimen is an excellent one with two immature inflorescences and four mature infructescences. There is an elongated subhorizontal rhizome about 8 mm. thick with a dense tuft of leaves at the end. The leaves are up to 1 m. long and about 1–1.5 cm. wide, long attenuate to the filiform very scabrous tip, but not much narrowed to the somewhat conduplicate base. The scapes are about 10 cm. long and the inflorescence about 3.5 cm. long and 2–2.5 cm. wide; the nut is 7–9 mm. long and 3.5–4 mm. wide.

Mapania Archboldii Uitt. in Jour. Arnold Arb. 20: 214. 1939.

PAPUA: Western Division: Palmer R., 2 miles below junction with Black R., *Brass 7164*, July 1936, alt. 100 m., locally abundant in ridge forest undergrowth (achenes black) (type-collection).

Mapania dictyophlebia sp. nov. Subgen. *Pandanoscirpus* Uitt. PLATE II.

Rhizoma lignosum, 8 mm. crassum, fibris tectum. Folia subflaccida usque ad circa 60 cm. longa, 10–20 mm. lata, multinervia reticulata nervis 3 validioribus conspicuis pallidis, basin versus angustata et conduplicata, apice in acumen longum subtriquetrum scaberrimum sensim attenuata, marginibus costaque pro majore parte spinuloso-scabra. Scapi 6–10 cm. longi monostachyi, subtrigoni, striati ceterum laeves, glabri, basi gracillimi circa 0.7 mm. crassi squamis nonnullis pallidis laxis breviter obtecti, sursum admodum incrassati circa 1 mm. crassi. Spicula pallide brunnea, 13–15 mm. longa, sub anthesi fere oblonga circa 5 mm. lata, sub fructu tandem subglobosa usque ad 14 mm. lata. Glumae ovato-oblongae, obtusae, 8 mm. longae, multinerves, marginibus hyalinae sursum minute ciliolatae. Flores oblique lineares, 9 mm. longae. Nux obovato-pyriformis, apiculata, breviter stipitata, haud angulata, indistincte crebreque rugulosa, 4.2 mm. longa (stipite 0.8 mm. longo incluso), 2.4 mm. lata; exocarpium spongiosum; endocarpium durum, nigrum.

NETHERLANDS NEW GUINEA: 4 km. SW. of Bernhard Camp, Idenburg R., *Brass 13428* (TYPE), March 1939, alt. 850 m., rain-forest, one clump on the bank of a small stream.

Allied to *M. Archboldii* Uitt., differing in the broader, less rigid, conspicuously tessellated leaves, smooth scapes, smaller spikelets and flowers and smaller nut less acuminate at each end.

Mapania cuspidata (Miq.) Uitt. in Jour. Arnold Arb. 20: 213. 1939.

Lepironia cuspidata Miq. Fl. Ind. Bat. Suppl. 1: 603. 1860.

Mapania petiolata C. B. Clarke var. *cuspidata* (Miq.) Uitt. in Rec. Trav. Bot.

Néerl. 33: 282. 1936, in Meded. Bot. Mus. Herb. Univ. Utrecht 32: 282. 1936; with synonymy.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg R., *Brass 13896*, April 1939, alt. 120 m., frequent in rain-forest of lower mountain slopes.

SOLOMON ISLANDS: San Cristobal: Hinuahaoro, *Brass 3046*, Sept. 1932, alt. 900 m., forest floor, common (flower yellow).

The typical form of the species has been recorded from Malaya, Sumatra, Java and Borneo. Uittien, ll.cc., distinguishes three varieties, closely connected with one another and the typical form by intermediates; he refers (1939, l.c.) *Brass 7382* from the Palmer River, Papua (which I have not seen) to var. *petiolata* (C. B. Clarke) Uitt. l.c., which appears to be pan-Malaysian. *Carr 12772* from Koitaki, Papua, in herb. Canberra, also appears to belong to this variety; it was referred to *M. petiolata* C. B. Clarke by Kükenthal in Engl. Bot. Jahrb. 69: 261. 1938. *Brass 3046* and *13896* agree with one another as to foliage, which approaches that of var. *augustifolia* (Uitt.) Uitt. rather than var. *petiolata*, but no. *13896* has the short spikelets about 1.5 cm. long of the typical form on short scapes, 4–8 cm. long.

Subgen. **Cephaloscirpus** (Kurz) Bentham & Hooker

Mapania Moseleyi C. B. Clarke in Kew Bull. Add. Ser. 8: 55. 1908.

Mapania Ledermannii Kükenth. in Engl. Bot. Jahrb. 59: 57. 1924; Ohwi in Bot. Mag. Tokyo 56: 212. 1942.

NETHERLANDS NEW GUINEA: 4 km. SW. of Bernhard Camp, Idenburg R., *Brass 13429*, March, 1939; alt. 850 m., rain-forest undergowth, frequent on steep slopes; 6 km. SW. of Bernhard Camp, Idenburg R., *Brass 12804*, Feb. 1939, alt. 1200 m., tufted terrestrial, occasional in rain-forest.

Uittien in Jour. Arnold Arb. 20: 213. 1939, cites the type of *Mapania Ledermannii* under *Mapania Moseleyi* Clarke f. *latifolia* forma nov. There appears to be some confusion in the paragraphs concerned and to judge from the description of the leaves of f. *latifolia* and the width of the leaves of other specimens cited, it would appear that Uittien's intention was to regard the type of *M. Ledermannii* Kükenth. (*Ledermann 12990*), *Docters van Leeuwen 10452a* and *Gyellerup 524* as conspecific with *M. Moseleyi*. *Mapania Moseleyi* f. *latifolia* is then to be regarded as based entirely on *Brass 7384* (which I have not seen) which differs from the type in having no stem-leaves besides the characters given in the Latin diagnosis. *Brass 12804* and *13429* have each two stem-leaves; the leaves on *12804* are 8–10 mm. wide, in *13429* they are 5–7 mm. wide.

Mapania macrocephala (Gaud.) K. Schum. in Warb. in Engl. Bot. Jahrb. 13: 265. 1891; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 189. 1900; Valck. Suring. in Nova Guin. Bot. 8: 711. 1912; Ridl. in Trans. Linn. Soc. II, Bot. 9: 245. 1916; Kükenth. in Engl. Bot. Jahrb. 59: 56. 1924; Rehd. in Jour. Arnold Arb. 14: 65. 1933; Ohwi in Bot. Mag. Tokyo 56: 211. 1942.

Hypolytrum macrocephalum Gaud. in Freycin. Voy. 414. 1826.

Cephaloscirpus macrocephalus (Gaud.) Kurz in Jour. As. Soc. Bengal 38 (2): 83. 1869.

Lepironia macrocephala (Gaud.) Miq. Ill. Fl. l'Arch. Ind. 64, *t. 27*. 1871.

PAPUA: Western Division: Palmer R., 2 miles below junction with Black R., *Brass 7241*, July 1936, alt. 100 m., in large clumps in swamps and on banks of streams cutting flood plains (leaves ± 4.5 m. long, 6 cm. broad; infructescence ± 8 cm. long, 9 cm. diam.) (det. Uittien). Central Division: Upoia, Vailala R., *Brass 1158*, March 1926, in large clumps in swampy soil resembling in appearance a young *Pandanus* (leaves 6–7 ft. long, recurved, margins serrate; peduncle erect 18–12 in. high, 3-angled with one or two long leaf-like bracts with sheathing leaves on lower portion).

SOLOMON ISLANDS: Bougainville: Kugumaru, Buin, *Kajewski 1987*, July 1930, alt. 150 m., in swamps, common (a rush up to 2 m. high, leaves slightly serrated, buds covered with short fine silky hair).

Previously known from the Moluccas, Admiralty Islands, New Ireland, Netherlands New Guinea and the Central Division of Papua (*Brass 1158*, cf. Rehder, l.c.). It also occurs in north-east Queensland (S. T. Blake in Proc. Roy. Soc. Queensl. 58: ined.).

Lepironia L. C. Richard

Lepironia articulata (Retz.) Domin in Biblioth. Bot. 85: 486. 1915.

Restio articulatus Retz. Observ. 4: 14. 1786.

Lepironia mucronata L. C. Rich. in Pers. Syn. 1: 70. 1805; Kükenth. in Engl. Bot. Jahrb. 59: 58. 1924.

PAPUA: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7605*, August 1936, erect in bluish stands, over 2 m. high, forming small islets in the swamps; Gaima, Lower Fly R. (east bank), *Brass 8355*, Nov. 1936, associated with *Scleria chinensis* and *Restio* sp. in extensive open marshes in savannah forest.

New for Papua. The species is known from Malaysia, Caroline Islands, N. and E. Australia, Fiji, Madagascar, and is cultivated in China. In New Guinea it was previously known only from a single collection from North-East New Guinea. The nomenclature has been discussed by me in Proc. Roy. Soc. Queensl. 54: 71, 72. 1943.

Cyperus Linnaeus

Subgen. Eucyperus (Griseb.) C. B. Clarke

Cyperus stoloniferus Retz., Observ. 4: 10. 1786; Valck. Suring. in Nova Guin. Bot. 8: 698. 1912.

Cyperus Carrii Kükenth. in Engl. Bot. Jahrb. 69: 256. 1938.

PAPUA: Central Division: Hisiu, *Carr 11415*, Feb. 1935, sandy beaches, sea-level (herb. Canberra).

It was on this collection that Kükenthal founded his *C. Carrii* which he placed in subgenus *Mariscus* sect. *Thunbergiani*. The specimen in herb. Canberra has well-developed tubers, is certainly *Eucyperus*, and, although somewhat immature as to the nuts, is evidently the wide-spread chiefly coastal *C. stoloniferus* Retz. The specimen seen by Kükenthal apparently bore no tubers; otherwise his description accords with the specimen seen by me. *Cyperus stoloniferus* ranges from Madagascar and India to Queensland, but has not previously been recorded for Papua.

Cyperus digitatus Roxb. Hort. Beng. 81. 1814, *nomen*, Fl. Ind. 1: 205. 1820; F. Muell. in Proc. Linn. Soc. N.S. Wales II, 2: 422. 1887, and Pap. Pl. 2: 69. 1890; Valck. Suring. in Nova Guin. Bot. 8: 699. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 45. 1924, in Pflanzenr. 101 (IV. 20): 55. 1935.

Cyperus auricomus Sieb. sensu K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 191. 1900, not *C. auricomus* Sieb.

Cyperus racemosus Retz. sensu K. Schum. & Lauterb., l.c., 192, not *C. racemosus* Retz.

Cyperus auricomus var. *microstachyus* Boeck. in K. Schum. & Hollr. Fl. Kaiser Wilhelmsl. 23. 1889.

PAPUA: Western Division: Penzara, between Morehead and Wassi Kussa Rivers, *Brass 8446A*, Dec. 1936, in marshy shallows of waterhole (det. Kükenthal). Central Division: Haga, Loloki River, *Brass 892*, Jan. 1926, growing on swamp borders, 2 ft. high.

Kükenthal, in Engl. Bot. Jahrb. 69: 255. 1938, refers *Carr 15532* to this species, but the specimen under this number in herb. Canberra belongs to *C. distans* L.f.

Cyperus malaccensis Lam. Illustr. 1: 146. 1791; Kükenth. in Pflanzenr. 101 (IV. 20): 86. 1935, and in Engl. Bot. Jahrb. 69: 255. 1938.

PAPUA: Western Division: Lower Fly R. east bank opposite Sturt Island, *Brass 8083*, October 1936, on river mud flats; Gaima, Lower Fly R. (east bank), *Brass 8312*, Nov. 1936, codominant with no. *8311* (= *Scirpus grossus* L.f.) in a dense sedge community, 1–1.2 m. high, on open sandy foreshores covered by spring tides. Gulf Division: Vailala Estuary, *Brass 1185*, March 1926, on tidal mudbanks (3–4 ft. high). Central Division: Arda R., *Carr 11427*, Feb. 1935, sea-level, marshes along river bank, growing in brackish water (ca. 2 ft. tall — native name "Geida," used for making sleeping mats, etc.). Eastern Division: Domara R., *Brass 1582*, May 1926, on muddy river bank (stems used by natives for mat-making).

Widely spread in the Eastern Hemisphere, from Mesopotamia to Polynesia and Northern Australia. Kükenthal has seen all Brass's collections and nos. *1185, 1582* are cited in his monograph.

Cyperus Zollingeri Steud. in Zollinger, Verz. Ind. Archip. 2: 62. 1854, *nomen*, Synops. Cyp. 17. 1855; Kükenth. in Engl. Bot. Jahrb. 59: 44. 1924; 69: 255. 1938, in Pflanzenr. 101 (IV. 20): 133. 1935; Ohwi in Bot. Mag. Tokyo 56: 200. 1942.

NETHERLANDS NEW GUINEA: Balim R., *Brass 11730*, Dec. 1938, alt. 1600 m., deforested slopes, abundant on sandy soil. PAPUA: Western Division: Gaima, Lower Fly R. (east bank), *Brass 8249*, Nov. 1936, open savannah forest, yellowish sedge common on hard soils (det. Kükenthal). Central Division: Mafulu, *Brass 5407*, Sept.-Nov. 1933, alt. 1250 m., rare on rubbly soil ridge-crest in *Castanopsis* forest.

The species is widely spread in the Old World tropics.

Cyperus distans L.f. Suppl. 103. 1781; F. Muell. Pap. Pl. 1: 73. 1876; Becc. in D'Albertis New Guinea 2: 399. 1880; Valck. Suring. Nova Guin. Bot. 8: 699. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 44. 1924, in Pflanzenr. 101 (IV. 20): 137. 1935; Ohwi in Bot. Mag. Tokyo 56: 199. 1942.

PAPUA: Central Division: Laloki R., *C. T. White 172*, July-August 1918; Mafulu, *Brass 5533*, Sept.-Nov. 1933, 1250 m., wet ground on roadside in forest; Isuarava, *Carr 15532*, Feb. 1936, alt. ca. 4500 ft., damp places (herb. Canberra); Bella Vista, *C. T. White 418*, July-August 1918, alt. ca. 5000 ft.

Cosmotropical; Carr's collection was referred to *C. digitatus* Roxb. by Kükenthal in Engl. Bot. Jahrb. 69: 255. 1938.

Cyperus Iria L. Sp. Pl. 1: 45. 1753; K. Schum. in Notizbl. Bot. Gart. Mus. Berlin 2: 95. 1898; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 192. 1900; Valck. Suring. in Nova Guin. Bot. 8: 698. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 44. 1924, in Pflanzenr. 101 (IV. 20): 150. 1935.

PAPUA: Western Division: Daru Island, *Brass 6055*, March 1934, road ditches, not common; Daru Island, *Brass 6298*, March 1936, wet ground in open situations, not common (det. Kükenthal).

New for Papua. The species is widely spread in the tropical and some subtropical parts in Asia and Australia, and occurs, apparently as an introduction, in parts of the United States and the West Indies.

Cyperus platystylis R. Br. Prodr. 214. 1810.

PAPUA: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7631*, August 1936, common on swamp margins and floating islands of lake (det. Kükenthal).

New for New Guinea. The species has been recorded from south-east Asia (India to Malaya), Java, Borneo, Queensland and New South Wales.

Cyperus diffusus Vahl, Enum. 2: 321. 1806; F. Muell. Pap. Pl. 1: 31. 1876; K. Schum. & Hollr. Fl. Kaiser Wilhelmsl. 24. 1889; Warb. in Engl. Bot. Jahrb. 13: 264. 1891; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 192. 1900; Palla in Rechinger, Denkschr. Math.-Naturw. Kais. Akad. Wiss. Wien 89: 498. 1913; Ridl. in Trans. Linn. Soc. II, Bot. 9: 241. 1916; Ohwi in Bot. Mag. Tokyo 56: 199. 1942.

Cyperus pubisquama Steud. in Zoll. Verz. Ind. Arch. 2: 62. 1854; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 192. 1900.

Cyperus diffusus var. *macrostachyus* Boeck. in Linnaea 35: 534. 1868; Kükenth. in Pflanzenr. 101 (IV. 20): 209. 1936.

Cyperus diffusus var. *pubisquama* (Steud.) Hook. f. in Trimen, Handb. Fl. Ceylon 5: 28. 1900; Kükenth. in Engl. Bot. Jahrb. 59: 43. 1924.

Cyperus diffusus var. *celebicus* (Miq.) Kükenth. in Pflanzenr. 101 (IV. 20): 208. 1936.

Cyperus diffusus f. *macrostachyus* (Boeck.) Valck. Suring. in Nova Guin. Bot. 8: 697. 1912.

Cyperus diffusus f. *microstachya* Valck. Suring. l.c.

Cyperus diffusus f. *princeps* Valck. Suring. l.c.

Cyperus diffusus f. *celebicus* (Miq.) Kükenth. in Engl. Bot. Jahrb. 59: 43. 1924.

PAPUA: Without definite locality, *Mrs. H. P. Schlenker*, Sept. 1909. Western Division: Lake Daviumbu, Middle Fly R., *Brass 7690*, Sept. 1936, in semi-shade in swamp-margins; Lower Fly R., east bank opposite Sturt Island, *Brass 8141*, October 1936, plentiful as scattered ground cover in open parts of *Erythrina* swamp forests; Penzara, between Morehead and Wassi Kussa Rivers, *Brass 8445*, Dec. 1936, semi-shade, in creek at margin of rain-forest. Central Division: Mekeo District, *C. T. White 810*, July-Aug. 1918.

SOLOMON ISLANDS: San Cristobal: Balego-nagonago, *Brass 2705*, August 1932, alt. 1500 ft., pathways and clearings in the rain-forests.

Brass 2705, *8141*, *White 810*, and *Schlenker's* specimen correspond more or less to *C. diffusus* var. *macrostachyus* Boeck. and *Brass 8141* was so determined by Kükenthal. But Kükenthal has also determined *Brass 7690* as belonging to this variety, though to me the specimen appears to be at least as close to the typical form as is *Brass 8445*, determined by Kükenthal simply as *C. diffusus*. The species is somewhat variable and two entities may indeed be involved but to judge from the series of specimens seen by me from Malaya, Philippine Islands and Queensland and those cited above, var. *macrostachyus* is too closely connected with the typical form by intermediates to warrant nomenclatural recognition. The degree of spreading of the glumes, which has been stressed as a distinguish-

ing character, seems to depend to some extent on variations in conditions during the drying of the specimen and to some extent also on the physiological state of the plant at the time of gathering. The length and the direction of the mucro on the glumes are certainly inconstant.

Cyperus pubisquama Steud. and *C. diffusus* var. *macrostachyus* Boeck. appear to have been founded on the same type, or at least on the same collection. The latter ternary combination has priority over *C. diffusus* var. *pubisquama* (Steud.) Hook. f. (1900), a combination made independently at a later date by Kükenthal (1924, l.c.). *Cyperus diffusus* f. *princeps* Valck. Suring. appears to be what Suringar takes as the typical form.

This wide-spread tropical species seems not to have been recorded previously from the Solomon Islands.

Cyperus cinereobrunneus Kükenth. sp. nov. in scheda. (Sect. *Incurvi* Kükenth.). FIG. 1, A.

Rhizoma breve? Culmus (unicus visus) 43 cm. altus, apice 2 mm. crassus, acute triqueter et leviter compressus, angulis sursum minute scaberulus, basi solum foliatus. Folia plura culmo multo usque duplo longiora, linearia, longe acuteque attenuata, 3.5–5 mm. lata, carina et marginibus plerumque recurvis vel revolutis tenuiter scabra, nervis 3 quam ceteris plus conspicuis; vaginae brunneae. Bracteae 4 foliiformes, inflorescentiam superantes, ima culmo longior. Anthela semicomposita; radii 5 fere filiformes, subtrigoni, angulis sursum scaberuli, imus 4 cm. longus; prophylla pallida brunneotincta, ore obliquissima; bracteolae fere squamiformes; radioli brevissimi. Spiculae 3–5-nim digitatae vel solitariae, cinereo-brunneae, lineares, acutae, compressae, 8–10 mm. longae, ca. 2 mm. latae, 12–16-florae, Rhachilla recta, vix alata. Glumae subcoriaceae, 2.3–2.7 mm. longae, (explanatae) oblongo-ovatae, obtusae, mucronatae, crebre circa 15–17-nerves in parte superiore sola distincte carinatae, incurvae, basi articulatae, marginibus subhyalinae et sursum admodum involutae, 3–4 imae vacuae gradatim breviores. Stamina 3; antherae 0.7 mm. longae, apice haud setosae; filamenta linearia ferruginea. Stylus 0.7–0.9 mm. longus, ima basi excepta pilosulus; stigmata 3 pilosula, 0.5–0.6 mm. longa. Nux ellipsoidea, acuta, triquetra, lateribus concava, circa $\frac{1}{2}$ glumam adaequans, 1.4–1.5 mm. longa, 0.7–0.8 mm. lata.

PAPUA: Western Division: Oroville Camp, Fly R., *Brass 7418* (TYPE), August 1936, in tufts on forest-floor.

The specimen seen consists of a single culm with a very short piece of rhizome attached. The label bears the determination "Cyperus cinereobrunneus Kükenth. sp. nov." There is no evidence that a description has been published or even drawn up.

The species appears to be most closely allied to *C. subpapuanus* Kükenth. but has narrow leaves, the glumes incurved to the tip with smooth not scabrous keel and with more numerous nerves, acute nuts and a longer style. The narrow leaves, incurved tips of the glumes and acute nut recall *C. meistostylus* S. T. Blake, but the leaves are more numerous, the spikelets are more distinctly digitate, the nut is relatively shorter and the style is longer. It somewhat resembles the Australian *C. semifertilis* S. T.

Blake in appearance and in that the lowermost glumes are smaller and empty, but it differs in that all the flowers (except perhaps the one uppermost in the spikelet) are bisexual, in the longer glumes, and in that the nut is much smaller than the glume and has concave sides.

Cyperus meistostylus sp. nov. (Sect. *Incurvi* Kükenth.). Fig. I, B.

Herba graminea perennis, rhizomate brevissimo. Culmi caespitosi, erecti, acute triquetri, laeves, 26–33 cm. alti, apice usque 2 mm. crassi. Folia pauca prope basin culmi stipata quorum superiora culmo breviora vel inflorescentiam valde superantia, linearia, sursum longe attenuata, basin versus haud vel minime angustata, 5–7 mm. lata, tenuiter nervosa nervis 3

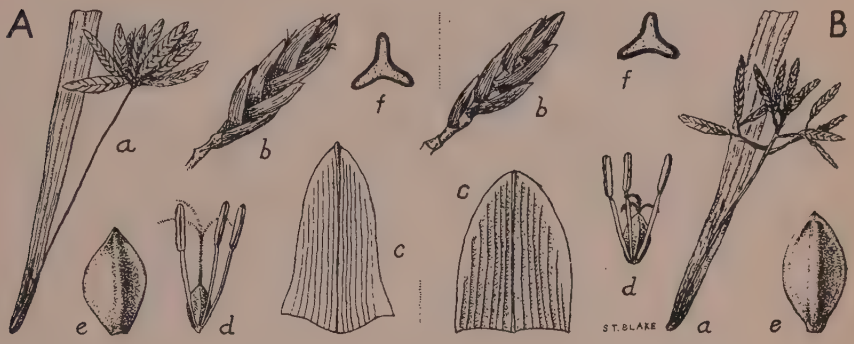


Fig. 1. A. *Cyperus cinereobrunneus* Kükenth.; B. *Cyperus meistostylus* S. T. Blake: *a*. one of the longer rays of the inflorescence with the lower part of its bract, × 1; *b*. upper part of spikelet with the lower glumes removed to show rhachilla, × 4; *c*. glume, flattened out, × 10; *d*. flower, × 10; *e*. nut, × 10; *f*. transverse section of nut, × 10. Figures from type-specimens.

plus prominulis, carina marginibusque sursum minute scabra; vaginae purpurascentes. Bracteae foliiformes valde inaequales, 3 inflorescentia longiores et ima usque ad 30 cm. longa. Anthela semicomposita, contracta, 3.5–4.5 cm. diam.; radii 4 usque ad 3 cm. longi, rigidi, compressi uno latere concavi; radioli, si adsunt, breves; prophylla purpureo-striata, ore obliquissima. Spiculae 3–5-nim approximatae, haud digitatae, lineares, acutae, compressae, 5–12 (plerumque 7–8) mm. longae, 1.5 mm. latae, 8–16-florae. Rhachilla recta vix alata. Glumae laxiusculae tandem subpatulae, fusco-sanguineae, 2–2.4 mm. longae, (explanatae) oblongo-ovatae apice late angusteve rotundatae, muticae, basi articulatae, 13–15-nerves, carina leviter incurvae ejus apice minute setulosae, marginibus glabrae vix hyalinae. Stamina 3, antherae lineares, 0.7 mm. longae apice laeves glabraeque; filamenta linearia ferruginea. Nux elliptica, acuta, triquetra angulis rotundata lateribus concava, brunnea, punctulata, $\frac{2}{3}$–$\frac{3}{4}$ glumae adaequans, circa 1.6 mm. longa et 0.85 mm. lata. Stylus brevissimus minus quam 0.1 mm. longus; stigmata 3, brevia, ca. 0.5 mm. longa, pilosula.

Papua: Central Division: Dieni, Ononge Road, *Brass 3933* (type), May 1933, alt. 500 m., scattered through rain-forest and common in regrowth.

The specimen seen consists of a tuft of three culms of which one bears

a young inflorescence, another a mature and the third an over-mature inflorescence. One culm has the uppermost leaf much shorter than the culm; on the others the leaves are very long, up to 42 cm.

The species is allied to *C. tetraphyllus* R.Br., *C. subpapuanus* Kükenth., *C. papuanus* Ridl. and *C. pedunculosus* F. Muell. In appearance it resembles rather closely the Australian *C. tetraphyllus,* but differs in the less digitate spikelets with longer relatively narrower, less broadly rounded, less strongly incurved glumes with more numerous nerves, anthers with non-setulose tips, the nut decidedly shorter than the glumes, rather narrower and more acute with more deeply concave sides, and in the pilosulose stigmas. From the other three species it differs in the narrower leaves: from *C. subpapuanus* it is further distinguished by the non-scabrous keel of the scarcely mucronate glumes which are scarcely excurved at the tip and have more numerous nerves, and by the acute rather than obtuse tip of the nut; from *C. papuanus,* of which the ripe nut is unknown, it is further distinguished by the spikelets not digitate, the broader loosely imbricate glumes and the smooth tips to the anthers; and from *C. pedunculosus* it further differs by its fewer bracts, smaller narrower spikelets less digitately arranged, the rather smaller more obtuse less coriaceous muticous glumes, much shorter style and stigmas, and (relative to the glume) rather larger nut with more deeply concave sides and more acute tip.

Cyperus pedunculosus F. Muell. Fragm. 8: 266. 1874; C. B. Clarke in Kew Bull. 1899: 113. 1899; Valck. Suring. in Nova Guin. Bot. 8: 697. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 43. 1924, in Pflanzenr. 101 (IV. 20): 222. 1936.

Cyperus montis-sellae K. Schum. in Warb. in Engl. Bot. Jahrb. 18: 186. 1894; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 191. 1900; Valck. Suring. l.c. 698.

Cyperus pedunculosus var. *floribundus* Kükenth. in Engl. Bot. Jahrb. 59: 44. 1924, in Pflanzenr. 101 (IV. 20): 223. 1936.

Cyperus pedunculosus var. *atrocastaneus* Kükenth. in Engl. Bot. Jahrb. 69: 256. 1938.

PAPUA: Central Division: Isuarava, *Carr 15451*, Feb. 1936, alt. ca. 4000 ft., open places (herb. Canberra). Eastern Division: U-uma River, *Brass 1437*, May 1926, on creek-banks (common name "gudua").

In Pflanzenr., Kükenthal (1936) refers *Brass 1437* to var. *floribundus* Kükenth. while *Carr 15451* is a syntype of var. *atrocastaneus* Kükenth. Judged from the material in the Australian herbaria the species varies somewhat in size and degree of division of the inflorescence, colour, size (2.6–3.5 mm. in length), and degree of inrolling of the glumes and in the shape of the nut. The nut varies in outline from obovate to ovate-elliptic with the apex obtuse to more or less acute; in length it is about half as long as the glume. Mueller's type specimens have elongated rays with rather pale coloured glumes; some of the inflorescences are overmature. Other specimens, particularly when immature (as in the case of *Carr 15451*), have intensely coloured glumes, sometimes nearly black. *Cyperus pedunculosus* var. *floribundus* appears to comprise the larger plants with

very mature spikelets which keep on lengthening after the lower glumes have fallen away; var. *longibracteatus* Domin in Biblioth. Bot. 85: 425, fig. 98. 1915* and var. *atrocastaneus* are young or youngish plants with short rays.

Outside New Guinea the species occurs in rain-forests in Eastern Queensland.

Cyperus Haspan L. Sp. Pl. 1: 45. 1753 (excl. Herb. Linn.); Valck. Suring. in Nova Guin. Bot. 8: 697. 1912; Ridl. in Trans. Linn. Soc. II, Bot. 9: 241. 1916; Kükenth. in Pflanzenr. 101 (IV. 20): 247. 1936, in Engl. Bot. Jahrb. 69: 256. 1938; Ohwi in Bot. Mag. Tokyo 56: 200. 1942.

PAPUA: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7530*, August 1936, savannahs, occasional on margins of swamps (det. Kükenthal); Daru Island, *Brass 6053*, March 1934, common in road ditches, stems 3-angled. Central Division: Koitaki, *Carr 12276*, May 1935, swamps in open savannah land, ca. 1500 ft. (ca. 2 ft. tall).

Carr's specimens represent the form with creeping rhizomes; the collection was cited by Kükenthal, 1938. *Brass 6053* appears also to represent this form, while the tufted form is represented by the other collection. These collections are the only ones known from Papua of this widely spread species. It has not been reported from North-East New Guinea.

Cyperus aquatilis R. Br. Prodr. 213. 1810.

PAPUA: Western Division: Daru Island, *Brass 6056*, March 1934, common in road ditches, stem 3-angled.

Previously known only from N. and NE. Australia. The taxonomy has been discussed elsewhere in Proc. Roy. Soc. Queensl. 51: 36–40. 1940.

Subgen. **Juncellus** (Griseb.) C. B. Clarke

Cyperus pygmaeus Rottb. Descr. et Icon. 20, t. 14, fig. 4, 5. 1773; Valck. Suring. in Nova Guin. Bot. 8: 697. 1912.

Cyperus Michelianus (L.) Link subsp. *pygmaeus* (Rottb.) Aschers. & Graebn. Synops. II. 2: 273. 1903; Kükenth. in Engl. Bot. Jahrb. 59: 42. 1924, in Pflanzenr. 101 (IV. 20): 312, fig. 35, F-G. 1936.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg R., *Brass 14083*, April 1939, on logs floating in lagoons. PAPUA: Western Division: Penzara, between Morehead and Wassi Kussa Rivers, *Brass 8439*, Dec. 1936, abundant along margins of waterhole.

Previously recorded from North-East New Guinea. The species is widely spread through Africa, S. and E. Asia to Australia.

C. B. Clarke in Jour. Linn. Soc. 21: 29–30. 1884 has set out the evidence for treating *Scirpus Michelianus* L. [*Cyperus Michelianus* (L.) Link] as generically distinct from *Cyperus pygmaeus* and, although the differential characters are not always so obvious as implied by Clarke, I believe his conclusions to be correct. Kükenthal in Pflanzenr. 101 (IV. 20): 14 and 311 regards *S. Michelianus* as a somewhat anomalous species of *Cyperus* differing only in the spiral, not distichous glumes, and entirely ignores the minute differences in style and nut structure discussed by Clarke. But

* To judge from specimens collected near the type-locality which agree with the description and figure; I have not seen Domin's specimens.

even if the two forms were admitted as congeneric it seems impossible to me to treat *C. pygmaeus* as a subspecies of *C. Michelianus* as has been done by Kükenthal, l.c., 312, following Ascherson & Graebner.

The two collections cited above consist of greatly elongated plants answering more or less to Kükenthal's *C. Michelianus* subsp. *pygmaeus* f. *filifolius* (Franch. & Sav.) Kükenth., l.c., 314, and *Brass 8439* was received labelled as such. But similarly elongated individuals are quite common in numerous annual Cyperaceae and at least in most cases are due to local environmental conditions, and it seems quite unnecessary to distinguish them taxonomically.

Subgen. Pycreus (Beauv.) C. B. Clarke

Cyperus globosus All. Fl. Pedem. 49. 1789; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 191. 1900; Kükenth. in Engl. Bot. Jahrb. 59: 42. 1924, in Pflanzenr. 101 (IV. 20): 352. 1936.

NETHERLANDS NEW GUINEA: Balim R., *Brass 11819*, Dec. 1938, alt. 1600 m., deforested slopes, common on moist sandy soil; 9 km. NE. of Lake Habbema, *Brass 10744*, Oct. 1938, alt. 2800 m., abundant on a native clearing in the forest in large weak clumps; Bele R., 18 km. NE. of Lake Habbema, *Brass 11541*, Nov. 1938, alt. 2200 m., covering a small sandy beach in river. PAPUA: Western Division: Gaima, Lower Fly R. (east bank), *Brass 8309*, Nov. 1936, common on sandy foreshores.

A species widely spread in the Old World, but in New Guinea previously known from North-East New Guinea only. Valckenier Suringar, in Nova Guin. Bot. 8: 697. 1912 cites "**Cyperus globosus** forma **strictus** Cl." from Netherlands New Guinea. Such a combination was not made by Clarke and apparently *C. globosus* var. *strictus* C. B. Clarke was intended. Kükenthal in Pflanzenr. 101 (IV. 20): 355. 1936 cites as a synonym of *C. globosus* var. *nilagiricus* (Hochst.) C. B. Clarke "*C. globosus* f. *stricta* Suringar, Het gesl. Cyperus in d. Mal. Arch. (1898) 58, t. II, fig. 12; non C. B. Clarke"; this appears not to refer to New Guinea specimens.

Brass's specimens are much closer to the typical form of the species than to any of the described varieties. His *8309* has the nut broadest at the middle and Kükenthal has in MS. suggested distinguishing it as a variety. But from the material of the species in the Queensland Herbarium there seems a perfect intergrading series from such oblong-elliptic nuts to the much more usual obovate nuts; in other words the widest part of the nut is at or a little above the middle, and in the latter case the nut is sometimes narrowed to a greater degree towards the base than towards the apex.

Cyperus sulcinux C. B. Clarke in Jour. Linn. Soc. 21: 56. 1884; Kükenth. in Engl. Bot. Jahrb. 59: 42. 1924, in Pflanzenr. 101 (IV. 20): 364, *fig. 43*. 1936.

PAPUA: Central Division: Sogere, *L. S. Smith N. G. 51*, May, 1944, alt. ca. 450 m., slender sedge 6 in. high growing along track through dry low-lying area.

Previously recorded from North-East New Guinea. Elsewhere known from India to Tonkin and the Moluccas.

Cyperus polystachyos Rottb. Descr. et Icon. 39, t. 11, fig. 1. 1773; K. Schum. in Engl. Bot. Jahrb. 9: 195. 1888; Boeck. in Engl. Bot. S.M.S. Gazelle 4 (1): 14. 1889; Valck. Suring. in Nova Guin. Bot. 8: 696. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 42. 1924, in Pflanzenr. 101 (IV. 20): 367. 1936.

PAPUA: Western Division: Daru Island, *Brass 6284*, March 1936, mixed with other sedges or in small pure stands in swamp-margins (det. Kükenthal).

Widely spread throughout the warmer parts of the world, but not yet found on the main island of New Guinea.

Cyperus nervulosus (Kükenth.) S. T. Blake in Proc. Roy. Soc. Queensl. 51: 41. 1940.
Cyperus pumilus var. *nervulosus* Kükenth. in Pflanzenr. 101 (IV. 20): 378. 1936.

PAPUA: Central Division: Baroka, Mekeo District, *Brass 3731*, April 1933, alt. 30 m., damp savannah flat, plentiful.

Previously known only from N. and NE. Australia.

Subgen. Mariscus (Gaertn.) C. B. Clarke

Cyperus stenophyllus Valck. Suring. in Nova Guin. Bot. 8: 701, t. 114. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 47. 1924.
Cyperus ornans Valck. Suring., l.c., 700, t. 113. 1912; Kükenth. in Pflanzenr. 101 (IV. 20): 418. 1936, in Engl. Bot. Jahrb. 69: 256. 1938.
Cyperus stenophyllus Valck. Suring. var. *ornans* (Valck. Suring.) Kükenth. in Engl. Bot. Jahrb. 59: 47. 1924.
Cyperus ornans Valck. Suring. var. *stenophyllus* (Valck. Suring.) Kükenth. in Pflanzenr. 101 (IV. 20): 419. 1936.

PAPUA: Central Division: Kanosia, *Carr 11107*, Feb. 1935, alt. ca. 100 ft., damp places under light shade (herb. ca. 2 ft. tall) and *Carr 11346*, Feb. 1935, alt. ca. 50 ft., river banks in forest (herb. ca. 15 in. tall) (both in herb. Canberra).

These specimens were cited by Kükenthal in 1938, l.c., as *C. ornans*. The names *Cyperus ornans* and *Cyperus stenophyllus* were published simultaneously. Under these circumstances, according to Art. 56 of the International Rules of Nomenclature, "the author who first adopts one of them, definitely treating another as a synonym or referring it to a subordinate group must be followed." Accordingly, *C. stenophyllus* must be used for the species in its extended sense and Kükenthal erred in changing his earlier treatment in 1936.

I do not think that the two species described by Valckenier Suringar can be distinguished from one another. As here understood *C. stenophyllus* is very close to the Australian *C. Bowmanii* F. Muell. ex Benth. from which it differs in that the spikelets are slightly thicker, more numerous and rather more loosely arranged on the rays, and the base of the plant is harder and moderately swollen, with dark-coloured sheaths. It appears to be restricted to the islands north of Australia from Java and the Philippines to the Solomon Islands and Tonga.

Cyperus compactus Retz. Observ. 5: 10. 1789; Kükenth. in Pflanzenr. 101 (IV. 20): 423. 1936, in Engl. Bot. Jahrb. 69: 256. 1938; Ohwi in Bot. Mag. Tokyo 56: 200. 1942; non Lam. (1791 or later).
Cyperus compactus f. *decolorans* (Kükenth.) Kükenth. in Pflanzenr., l.c., 424.
Cyperus dilutus Vahl, Enum. Pl. 2: 357. 1806; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 193. 1900; Valck. Suring. in Nova Guin. Bot. 8: 700. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 45. 1924.
Cyperus dilutus f. *decolorans* Kükenth. in Engl. Bot. Jahrb. 59: 45. 1924.

PAPUA: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7671*, Sept. 1936, conspicuous glaucous species sporadic on swamp-margins and on floating islands in the lake (det. Kükenthal); Dagwa, Oriomo R., *Brass 5921*, Feb.-March 1934, alt.

40 m. shallows of a lagoon on savannah, (tall grey sedge with striate leaves). Central Division: Kanosia, *Carr 11764*, April 1935, sea-level (herb. Canberra).

Carr's collection was cited by Kükenthal (1938, l.c.). Brass's specimens appear to be the only other specimens of this species known from Papua. The species has been reported from North-East and Netherlands New Guinea and extends northwards and westwards to South China and India and has been introduced into Reunion and Mauritius. The f. *decolorans* covers those (herbarium) specimens with paler coloured or faded spikelets and appears to have no real taxonomic significance; see below under *C. Holoschoenus*.

Cyperus javanicus Houtt. Nat. Hist. **13**: Aanwyz. Plaat. (1). t. 88, f. 1. 1782; Merr. in Jour. Arnold Arb. **19**: 321. 1938; non. Kükenth.

Cyperus pennatus Lam. Illustr. **1**: 144. 1791; F. Muell. Pap. Pl. **2**: 34. 1886; K. Schum. in Warb. in Engl. Bot. Jahrb. **13**: 264. 1891; K. Schum. in Notizbl. Bot. Gart. Mus. Berlin **2**: 96. 1898; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 193. 1900; Valck. Suring. in Nova Guin. Bot. **8**: 700. 1912; Kükenth. in Pflanzenr. **101** (IV. 20): 476, fig. 53, A-G. 1936.

Cyperus stuppeus Forst. f. Prodr. 89. 1786 (*nomen nudum*); Kükenth. in Engl. Bot. Jahrb. **59**: 45. 1924.

Cyperus canescens Vahl, Enum. Pl. **2**: 355. 1806; Guppy in Solomon Islands and Natives 304. 1887.

PAPUA: Western Division: Penzara, between Morehead and Wassi Kussa Rivers, *Brass 8444*, Dec. 1936, savanna forests, on flats of creek; Daru Island, *Brass 6271*, March 1936, frequent on damp soil in garden fallow growths (erect to 70–80 cm.); Daru Island, *Brass 6334*, March 1936, of occasional occurrence on littoral sand ridges. Gulf Division: Maclatchie Point, *Brass 1184*, March 1926, a coast plant. Central Division: Hula, *Brass 379*, October 1925, just above tide mark on sandy foreshores (4 ft. high); Hisiu, *Carr 11390*, Feb. 1935, sea-level, open sandy places near sea-shore (up to 3 ft. tall) (herb. Canberra); Port Moresby, *C. T. White 38*, July 1918, wet swampy places by coast (rather glaucous foliage). Eastern Division: Domara R., *Brass 1592*, May 1926, sea-level, on muddy river bank.

SOLOMON ISLANDS: Bougainville: Karugu, Buin, *Kajewski 2285*, Oct. 1930, sea-level, in swamps close to the sea-shore, common (a plant up to 1 m. high, growing in very wet swampy places, leaves with fine serrate edges, light brown flower-heads, native name "mala-muk teraugow").

This widely spread species has in the literature of New Guinea usually been called *Cyperus pennatus* Lam. I am indebted to Dr. E. D. Merrill for a copy of the appropriate passages and a tracing of the plate connected with Houttyn's binomial. To Merrill's discussion of the name, l.c., it may be added that:

1. No name is directly connected with Houttyn's description of a plant on p. 68, but there is a marginal reference to Plaat LXXXVIII, fig. 1.
2. On p. [III] of this volume, in the explanation of the plates, the binomial *Cyperus Javanicus* is definitely applied to Plaat LXXXVIII, fig. 1, and reference is made to p. 68.
3. The plate consists of a very good figure of an inflorescence with an enlarged figure (marked *a*) of a spikelet. Reference to this "a" is made in the description.

The validity of the binomial appears to rest upon the association of the name in the explanation of the plate with either the figure or with the

description or with both. That is, the formal description of the species is divided into parts, each occurring in different disjunct places in the volume. It is questionable whether this is in strict accord with either the letter or the spirit of Art. 44: "The name of a species . . . is not validly published unless it is *accompanied* (1) by a description, . . . or (3) by a plate or figure showing essential characters" (italics mine).

Kükenthal, in Engl. Bot. Jahrb. 69: 257. 1938, refers *Carr 11390* to *C. pennatus* var. *Armstrongii* (Benth.) Kükenth., a combination made in Pflanzenr. 101 (IV. 20): 479. 1936, and based on *C. Armstrongii* Benth. Fl. Austral. 7: 289. 1878. Bentham cites four collections after his original description: Port Essington, *Armstrong;* Port Darwin, *Schultz 731;* Percy Islands, *A. Cunningham;* Rockingham Bay, *Dallachy.* Dallachy's specimens belong to *C. tetracarpus* Boeck. I have not certainly seen specimens of the other collections cited, though Domin in Biblioth. Bot. 85: 440. 1915 refers Cunningham's specimens to what is here called *C. javanicus* and *Schultz 731* to *Mariscus Armstrongii* C. B. Clarke. C. B. Clarke in Kew Bull. Add. Ser. 8: 17. 1908, describes *Mariscus Armstrongii* sp. n., citing "*Cyperus Armstrongii,* Benth. Fl. Austral. 7: p. 289, quoad *Armstrong,* n. 616." This had best be interpreted as typifying Bentham's species on Armstrong's plant and then transferring the species in its emended sense to *Mariscus.** In any case, I do not see how Carr's immature specimen in herb. Canberra can be distinguished from *C. javanicus.*

Cyperus Holoschoenus R. Br. Prodr. 215. 1810; Kükenth. in Engl. Bot. Jahrb. 70: 463. 1940.

Cyperus Holoschoenus R. Br. var. *fusci-squamatus* Kükenth. in Bull. Jard. Bot. Buitenz. sér. III, 16: 301. 1940.

PAPUA: Western Division: Dagwa, Oriomo R., *Brass 5920,* Feb.-March 1934, alt. 40 m., shallow margins of a lagoon on savannah (tall sedge with shining somewhat scabrid leaves).

This collection is an isotype (or at least a haplotype) of Kükenthal's variety which is diagnosed with the words "Culmus 70 cm. altus. Squamae fuscae." It was also cited merely as *C. Holoschoenus* R.Br. by him in the same year in Engl. Bot. Jahrb. The material seen by me consists of one complete culm about 80 cm. long beneath the inflorescence with innovation shoots at the base and a second inflorescence with the upper part of the culm. The glumes appear to be dull brown, but under the microscope they are seen to be more or less variegated, varying from straw-brown to dull purplish brown. The colour of the glumes varies considerably, partly

* It might be argued that Clarke left under *Cyperus Armstrongii* the specimens which agreed with Bentham's description, i.e., Dallachy's specimens, which would then be regarded as the type of *Cyperus Armstrongii* Benth., synonymous with *C. tetracarpus* Boeck. He separated the discordant element which to him appeared to represent a new species and described it as *Mariscus Armstrongii* n. sp. The question, if of any real importance, cannot be settled without examining the specimens annotated by Clarke, though Domin's disposition of the specimens concerned probably follows that of Clarke in herb. Kew.

at least as the result of aging of the spikelet, as is well illustrated by some of my specimens from N. Queensland, while variations in conditions during the drying of specimens also produce variations in the colouration of the dried specimens.

Apart from Brass's specimens the species is known only from the far northern parts of Australia.

Cyperus cyperoides (L.) O. Ktze. Rev. Gen. Pl. 3 (2): 333. 1898; Kükenth. in Pflanzenr. 101 (IV. 20): 514. 1936; Ohwi in Bot. Mag. Tokyo 56: 201. 1942.

Scirpus cyperoides Linn. Mant. 2: 181. 1771.

Cyperus umbellatus (Rottb.) Benth. Fl. Hongk. 386. 1861, quoad syn.; sensu F. Muell. Pap. Pl. 2: 34. 1886; sensu K. Schum. & Hollr. Fl. Kaiser Wilhelmsl. 24. 1889; sensu K. Schum. in Warb. in Bot. Jahrb. 12: 264. 1891; non *Kyllinga umbellata* Rottb.

Cyperus cylindrostachys Boeck. in Linnaea 36: 383. 1870 (excl. syn.); K. Schum. in Engl. Bot. Jahrb. 9: 195. 1888; Valck. Suring. Nova Guin. Bot. 8: 700. 1912.

Mariscus Sieberianus Nees ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 6: 622. 1893; Palla in Rechinger, Denkschr. Math.-Naturw. Kais. Akad. Wiss. Wien 89: 499. 1913.

PAPUA: Central Division: Kubuna, *Brass 5614*, Nov. 1933, alt. 100 m., common, bed gravel banks.

Widely spread in Africa, tropical and temperate Asia and Australia, and in the West Indies. In New Guinea previously known from Netherlands New Guinea, North-East New Guinea and from "Proclamation Creek" (F. Mueller, l.c.).

This widely spread species has been most commonly known as *C. umbellatus*. The combination is usually attributed to Bentham in Fl. Hongk. 386. 1861, though Kükenthal in Pflanzenr. 101 (IV. 20): 523. 1936 attributes it to C. B. Clarke in Jour. Linn. Soc. 20: 296. 1883. Bentham, l.c., founded the combination on "*Mariscus umbellatus* Vahl; Kunth Enum. ii. 118." The name *Mariscus umbellatus* Vahl, Enum. Pl. 2: 376. 1806, was based on *Kyllinga umbellata* Rottb. Descr. et Icon. 15, t. 4, fig. 2. 1773; this name is not cited by Bentham, probably for the reason explained on p. 20 of the preface: "With regard to the synonymy, I have thought it generally unnecessary to repeat that which is already detailed in the general works referred to in the case of each well-known species." In Fl. Austral. 7: 289. 1878, Bentham cites the name *C. umbellatus*, Benth. Fl. Hongk. 386 with *Kyllinga umbellata* Rottb. in the synonymy. There seems little doubt that Bentham, in the last analysis, in his own mind definitely based his combination on that of Rottboell's, and even excluding the reference in Fl. Austral. the combination would be valid according to some recent interpretations of Art. 37 of the International Rules of Nomenclature, as there is an implied, indirect reference to Rottboell (*see* Airy-Shaw in Kew Bull. 1938: 256, 1938, and Sprague, Kew Bull. 1939: 322–3. 1939). It is however illegitimate because of the earlier *C. umbellatus* Burm. f. Fl. Ind. 21, t. 9, fig. 1. 1768, and *C. umbellatus* Roxb. Fl. Ind. 1: 205. 1820. *Kyllinga umbellata* Rottb. was based on an African plant which is nowadays regarded as distinct from the form represented by the New Guinea plant. Vahl apparently did not

distinguish the two and this broadened concept was accepted by Kunth and Bentham. Thus Bentham's *name* belongs to the form described by Rottboell, but his *description*, ll.cc., refers to the form described by Linnaeus, Mant. 2: 181. 1771, as *Scirpus cyperoides*, now known as *Cyperus cyperoides* (L.) O. Ktze.

Subgen. Kyllinga (Rottb.) Valckenier Suringar

Cyperus melanospermus (Nees) Valck. Suring., Het Gesl. Cyp. in Mal. Archip. 50, t. 2, fig. 8. 1898; Kükenth. in Engl. Bot. Jahrb. 69: 257. 1938.
Kyllingia melanosperma Nees in Wight, Contr. Bot. Ind. 91. 1834.

Netherlands New Guinea: Balim R., *Brass 11818*, Dec. 1938, alt. 1600 m., deforested slopes, common on moist sandy soil. Papua: Central Division: Mafulu, *Brass 5336*, Sept.-Nov., 1936, alt. 1250 m., seepage on roadside, one locality; Isuarava, *Carr 15469*, Feb. 1936, alt. c. 4000 ft., open places (up to 6 ft. tall) (herb. Canberra).

Carr's collection was cited by Kükenthal, l.c., together with one of Clemens' from North-East New Guinea, the only other collection known from the island. The species ranges from west, central and south Africa through India and China eastwards and southwards to New Guinea. *Brass 11818* is an unusually small individual, the culms being only 15–27 cm. high.

Cyperus brevifolius (Rottb.) Hassk. Catal. Hort. Bogor. 24. 1844; Valck. Suring. in Nova Guin. 8: 696. 1912; Kükenth. in Pflanzenr. 101 (IV. 20): 600. 1936.
Cyperus brevifolius (Rottb.) Hassk. var. *stellulatus* Valck. Suring. Het Gesl. Cyp. in Mal. Archip. 48, t. 2, fig. 5. 1898; Kükenth., l.c., 603, in Engl. Bot. Jahrb. 69: 257. 1938.
Kyllinga brevifolia Rottb. Descr. et Icon. 13, t. 4, fig. 3. 1773; Palla in Rechinger, Denkschr. Math.-Naturw. Kais. Akad. Wiss. Wien 89: 500. 1913; Ridl. in Trans. Linn. Soc. II, Bot. 9: 241. 1916; Kükenth. in Engl. Bot. Jahrb. 59: 42. 1924; H. J. Lam in Nat. Tijdschr. Ned. 88: 272. 1928.
Kyllinga brevifolia Rottb. var. *stellulata* (Valck. Suring.) Ohwi in Bot. Mag. Tokyo 56: 199. 1942.

Netherlands New Guinea: 4 km. SW. of Bernhard Camp, Idenburg R., *Brass 13256*, March 1939, alt. 850 m., rain-forest, gregarious on sandy beaches in river; 9 km. NE. of Lake Habbema, *Brass 10730*, Oct. 1938, alt. 2800 m., erect in dense clumps on a native clearing in forest; same locality and date, *Brass 10739*, on native clearing in forest. Papua: Western Division: Gaima, Lower Fly R. (east bank), *Brass 8303*, Nov. 1936, sporadic on open sandy foreshores. Central Division: Kubuna, *Brass 5687*, Nov. 1933, alt. 100 m., common, river bottom sandbanks.

Almost cosmopolitan, but not previously recorded for Papua.

Cyperus brevifolius var. *stellulatus* (*Kyllinga intermedia* R.Br.) comprises individuals with smooth, not spinulose keels to the glumes. Neither this nor the other characters enumerated by Kükenthal, l.c., are in any way constant and occur in varying combinations. I have found glumes with smooth keels and spinulose keels on the same plant.

Cyperus Kyllingia Endl. Catal. Hort. Acad. Vindob. 1: 94. 1842; Kükenth. in Pflanzenr. 101 (IV. 20): 606, fig. 64, C-D. 1936; Fosberg in Lloydia 3: 111. 1940.
Cyperus Kyllingia Endl. f. *humilis* (Boeck.) Kükenth., l.c., 608. 1936.
Cyperus Kyllingia Endl. f. *subtriceps* (Kunth) Kükenth., l.c., 608. 1936.
Cyperus monocephalus (Rottb.) F. Muell. Fragm. 8: 271. 1874; Valck. Suring. in Nova Guin. Bot. 8: 695. 1912, non Roxb.

Kyllinga monocephala Rottb. Descr. et Icon. 13, t. 4, fig. 3. 1773; F. Muell. Pap. Pl. 1: 31. 1876; Becc. in D'Albertis, New Guinea 2: 399. 1880; Guppy, Solomon Islands and Natives 304. 1887; K. Schum. in Engl. Bot. Jahrb. 13: 265. 1891, in Notizbl. Bot. Gart. Mus. Berlin 1: 47. 1895, 2: 96. 1898; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 194. 1900; Palla in Rechinger, Denkschr. Math.-Naturw. Kais. Akad. Wiss. Wien 89: 499. 1913; Ridl. in Trans. Linn. Soc. II, Bot. 9: 241. 1916; Kükenth. in Engl. Bot. Jahrb. 59: 41. 1924; Ohwi in Bot. Mag. Tokyo 56: 199. 1942.

Kyllinga monocephala Rottb. var. *mindorensis* Boeck. in Linnaea 35: 428. 1868; K. Schum. & Hollr. Fl. Kaiser Wilhelmsl. 24. 1889.

Kyllinga monocephala Rottb. f. *subtriceps* Kunth, Enum. Pl. 2: 130 1837; Kükenth. in Engl. Bot. Jahrb. 59: 42. 1924.

PAPUA: Western Division: Daru Island, *Brass 6401*, March 1936, common on wet ground (inflorescence white) (det. Kükenthal). Central Division: Baroka, Mekeo District, *Brass 3746*, April 1933, alt. 30 m., common, banks of small creek in rain-forest (flower heads white); Budatobara, *Brass 766*, Dec. 1925, alt. 300 ft., wet creek-banks.

SOLOMON ISLANDS: San Cristobal: Waimamura, *Brass 2803*, Sept. 1932, alt. 0 m., common, a weed on garden pathways (inflorescence white).

Pantropical. It seems superfluous and misleading to distinguish nomenclaturally such states as f. *humilis* and f. *subtriceps*. The former refers to depauperate specimens and the latter to robust states. *Brass 3746* shows the "typical" form and f. *subtriceps* on the same rhizome and *Brass 6401* is not very different.

Subgen. Torulinium (Desv.) Kükenthal

Cyperus ferax L. C. Rich. in Act. Soc. Hist. Nat. Paris 1: 106. 1792; Warb. in Engl. Bot. Jahrb. 18: 186. 1893; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 194. 1900; Kükenth. in Engl. Bot. Jahrb. 59: 46. 1924, in Pflanzenr. 101 (IV. 20): 615. 1936, fig. 6, K-P. 1935; Ohwi in Bot. Mag. Tokyo 56: 201. 1942.

?*Cyperus novae-hannoverae* Boeck. in Engl. Bot. Jahrb. 5: 91. 1884; Valck. Suring. in Nova Guin. Bot. 8: 701. 1912.

?*Cyperus ferax* L. C. Rich. var. *novae-hannoverae* (Boeck.) Kükenth. in Engl. Bot. Jahrb. 59: 4, 46. 1924; in Pflanzenr. 101 (IV. 20): 618. 1936.

Torulinium ferax (L. C. Rich.) Urban, Symb. Antill. 2: 165. 1900; Palla in Rechinger, Denkschr. Math.-Naturw. Kais. Akad. Wiss. Wien 89: 499. 1913.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg R., *Brass 13790*, April 1939, alt. 50 m., on logs floating in oxbow lakes and backwaters. PAPUA: Central Division: Ihu, Vailala R., *Brass 1015*, Feb. 1926, alt. 0 m., sago-swamp borders.

In Pflanzenr. 101 (IV. 20): 618. 1936, Kükenthal cites *Brass 1015* under *C. ferax* var. *novae-hannoverae* and it is on this authority that I have suggested treating *C. novae-hannoverae* Boeck. as synonymous with *C. ferax*. *Brass 1015* is a decidedly immature specimen.

Eleocharis R. Brown

Eleocharis fistulosa Link in Spreng. Jahrb. 3: 78. 1820.

PAPUA: Western Division: Dagwa, Oriomo R., *Brass 6010*, Feb.-March 1934, alt. 45 m., erect soft-textured sedge in shallow margins of a lagoon on savannah, uncommon.

New for New Guinea. A widely spread but apparently uncommon species known from Africa, S. and E. Asia, NE. Australia and from Mexico

and the West Indies to Argentina.

Eleocharis laxiflora (Thwaites) H. Pfeiff. in Mitt. Inst. Bot. Hamburg 7: 169. 1928.
Scirpus laxiflorus Thw. Enum. Pl. Zeyl. 435. 1864.
Eleocharis variegata (Poir.) Presl var. *laxiflora* (Thwaites) C. B. Clarke in Hook. f. Fl. Brit. Ind. 6: 626. 1893; Kükenth. in Engl. Bot. Jahrb. 59: 47. 1924; 69: 257. 1938 (as *Heleocharis*).

PAPUA: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7630*, August 1936, scattered among coarse sedges, etc., of floating islands (det. Svenson).

New for Papua. Previously known from North-East New Guinea to India and from Micronesia and Polynesia.

Eleocharis dulcis (Burm. f.) Trin. ex Henschel, Vita Rumph. 186. 1833; Svenson in Rhodora 41: 11. 1939.
Andropogon dulce Burm. f. Fl. Ind. 219. 1768.
Eleocharis plantaginea (Retz.) R. & S. Syst. 2: 150. 1817; K. Schum. in Notizbl. Bot. Gart. Mus. Berlin 2: 97. 1898; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 195. 1900; Valck. Suring. in Nova Guin. Bot. 8: 702. 1912 (all cited as *Heleocharis plantiginea* R. Br.).

PAPUA: Western Division: Mainland opposite Daru Island, *Brass 6064*, March 1934, dominant plant in large coastal swamp (stems cylindrical, shining dark green); Daru Island, *Brass 6288*, March 1936, extensive pure bright green even stand surrounding central open water of large swamp (plant ± 60 cm. high, half below water-level); coast between Oriomo and Fly Rivers, *Brass 6467*, April 1936, extensive pure stand filling freshwater swamp. Central Division: Isuarava, *Carr 15619*, Feb. 1936, alt. c. 4000 ft., damp places in the open (used by Biagi people in making skirts for their women; Biagi name: lorio) (herb. Canberra); Boridi, *Carr 12992*, Sept. 1935, alt. c. 4500 ft., source of stream in forest clearing (herb. Canberra).

The species extends from SE. Asia to Madagascar, Australia and Fiji. Brass's specimens had been previously determined by Svenson. Carr's specimens were referred to "*Heleocharis equisetina* Presl" by Kükenthal in Engl. Bot. Jahrb. 69: 257. 1938, but well-developed specimens of *E. equisetina* are distinguishable by having firmer culms, firmer, broader, shorter, subtruncate (not rounded), more or less shining glumes which are somewhat incurved when dry, hypogynous bristles more slender and quite free from one another (not conspicuously connate at the base), long-apiculate anthers, and bright-brown nut with acutely costulate margins and more regularly arranged external cells. But Carr's specimens are not very satisfactory and are in flower only.

Eleocharis spiralis (Rottb.) R. & S. Syst. 2: 155. 1817.
Scirpus spiralis Rottb. Descr. et Icon. 45. t. 15, f. 1. 1773.

PAPUA: Western Division: Daru Island, *Brass 6287*, March 1936, forms extensive practically pure stands, 50–60 cm. high in shallow swamp-margins (det. Svenson).

New for New Guinea; elsewhere known from Mauritius, Madagascar, SE. Asia, Borneo, Philippine Islands, NE. Australia and New Caledonia.

Eleocharis pellucida Presl, Rel. Haenk. 1: 196. 1830.

NETHERLANDS NEW GUINEA: 9 km. NE. of Lake Habbema, *Brass 10729*, Oct. 1938, alt. 2800 m., abundant in a clearing surrounding a native house in the forest.

New for New Guinea. Previously recorded from SE. Asia to Borneo and the Philippine Islands.

Bulbostylis Kunth

Bulbostylis barbata (Rottb.) C. B. Clarke in Hook. f. Fl. Brit. Ind. 6: 651. 1894; K. Schum. & Lauterb. Nachtr. Fl. Deutsch. Schutzgeb. Südsee 59. 1905; Kükenth. in Engl. Bot. Jahrb. 59: 51. 1924, 69: 258. 1938.

Isolepis barbata (Rottb.) R. Br. Prodr. 222. 1810; F. Muell. Pap. Pl. 1: 46. 1876. *Fimbristylis barbata* (Rottb.) Benth. Fl. Austral. 7: 321. 1878; Valck. Suring. in Nova Guin. Bot. 8: 704. 1912.

PAPUA: Western Division: Daru Island, *Brass 6385*, March 1936, a wet seasonal ephemeral common on patches of hard compacted soil (det. Uittien as *Fimbristylis barbata*). Central Division: Rona, Laloki R., *Brass 3575*, alt. 450 m., April 1933, common on flat rock surfaces.

Cosmotropical. The authorship of the combination under *Bulbostylis* is usually credited to Kunth, Enum. 2: 208. 1837, but it was first formally made by C. B. Clarke, l.c.

Specimens of this species were erroneously referred to *Scirpus setaceus* L. by K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 195. 1900.

Bulbostylis barbata f. *paupercula* Kükenth. in Engl. Bot. Jahrb. 70: 463. 1940, is evidently based on small plants with 1–2 spikelets. Such reduced states are frequently met with in annual members of the family and it seems quite unnecessary to distinguish them nomenclaturally.

Fuirena Rottboell

Fuirena umbellata Rottb. Descr. et Icon. 70, t. 19, fig. 3. 1773; F. Muell. Pap. Pl. 2: 18. 1885; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 194. 1900; Valck. Suring. in Nova Guin. Bot. 8: 706. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 52. 1924.

PAPUA: Western Division: Lake Daviumbu, Middle Fly R., *Brass 7632*, Aug. 1936, sporadic on floating islands and marshy shores of lake (det. Uittien); Gaima, Lower Fly R. (east bank), *Brass 8258*, Nov. 1936, common in swampy watercourses in savannah forest; Wuroi, Oriomo R., *Brass 5747*, Jan.-March 1934, alt. 10–20 m., straggling on a coarse sedge formation in a small swamp on savannah (stem 5-angled); Mabaduan, *Brass 6540*, April 1936, mixed with grasses in shallow rain-pools in savannah forest (det. Uittien).

Lipocarpha R. Brown

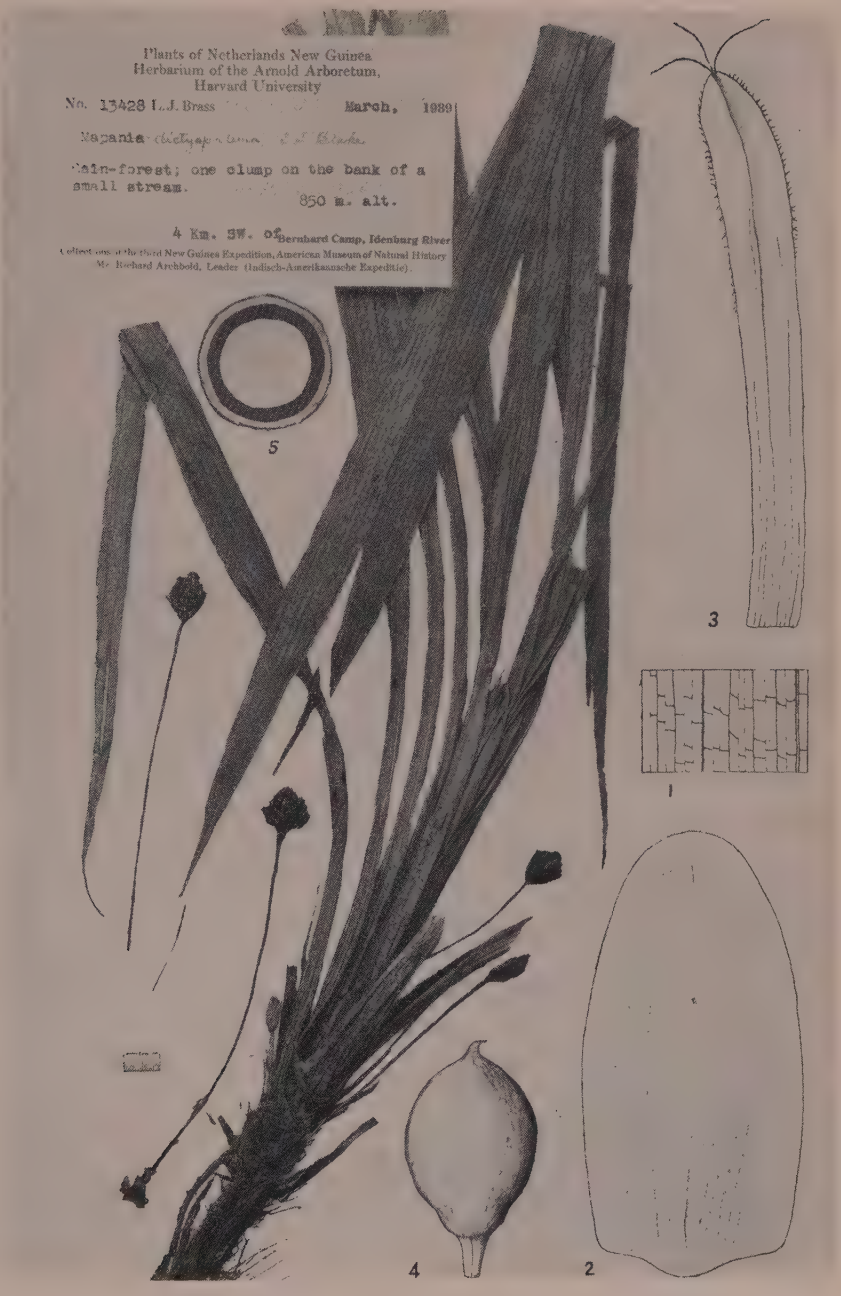
Lipocarpha microcephala (R. Br.) Kunth, Enum. 2: 268. 1837; F. Muell. Pap. Pl. 2: 34. 1886; Kükenth. in Engl. Bot. Jahrb. 59: 51. 1924; Ohwi in Bot. Mag. Tokyo 56: 204. 1942.

Hypaelyptum microcephalum R. Br. Prodr. 220. 1810.

PAPUA: Western Division: Daru Island, *Brass 6246*, March 1936, sporadic in damp soil of savannah forests (det. Uittien).

The species extends from Australia to tropical Asia. This is the first definite locality recorded for Papua. F. Mueller, l.c., and Domin in Biblioth. Bot. 85: 468. 1915 ascribe the combination *Lipocarpha microcephala* to R. Brown in Tuckey's Narr. Exped. Congo 459. 1818; but Brown made no such combination. The pertinent passage reads: "*Hypaelyptum argenteum* . . . is also in the collection. The name *Hypaelyptum*, under which I have formerly described the genus that includes *H. argenteum*[3] . . . " with a footnote reference to "*Prodr. Flor. Nov. Holl.* 1, *p.* 225."

PARAMAPANIA ATTENUATA S. T. BLAKE



MAPANIA DICTYOPHLEBIA S. T. BLAKE

Lipocarpha senegalensis (Lam.) Dandy in Jour. Bot. 70: 331. 1932, with full synonymy; Ohwi in Bot. Mag. Tokyo 56: 204. 1942.

Scirpus senegalensis Lam. Tabl. Encycl. 1: 140. 1791.

Lipocarpha argentea (Vahl) R. Br. ex Nees in Linnaea 9: 287. 1835; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 197. 1900; Valck. Suring. in Nova Guin. Bot. 8: 706. 1912; Kükenth. in Engl. Bot. Jahrb. 59: 51. 1925; 69: 259. 1938.

Netherlands New Guinea: Balim R., *Brass 11740*, Dec. 1938, alt. 1600 m., occasional on grassy long deforested slopes; 9 km. NE. of Lake Habbema, *Brass 10741*, Oct. 1938, alt. 2800 m., plentiful on a native clearing in the forest, pale greenish clumps 40–50 cm. high.

Ranges over tropical Africa, tropical Asia and tropical Australia. Previously recorded by Valckenier Suringar and Kükenthal, ll.cc., for New Guinea under the name of *L. argentea*. The rather complicated synonymy is discussed by Dandy, l.c.

EXPLANATION OF PLATES

Plate I.

Paramapania attenuata S. T. Blake. Type-specimen × ½ with analytical drawings. Fig. 1. Glume. Fig. 2. Flower with developing ovary; stamens fallen away. Fig. 3. Nut. Fig. 4. Transverse section of nut. All figures × 10.

Plate II.

Mapania dictyophlebia S. T. Blake. Type-specimen × ½ with analytical drawings. Fig. 1. Portion of leaf, × 3. Fig. 2. Glume. Fig. 3. Flower, the stamens fallen away. Fig. 4. Nut. Fig. 5. Transverse section of nut. Figs. 2 – 5 × 8.

Analytical drawings by S. T. Blake, Photography by W. J. Sanderson.

Queensland Herbarium,
Brisbane, Queensland, Australia.

NEW AND NOTEWORTHY CHINESE FAGACEAE

WOON-YOUNG CHUN

Lithocarpus brachystachya, n. sp.

Frutex 3–5 m. altus breviramosus dense foliosus; ramuli hornotini annotinique gracillimi subteretes flavo-brunnescentes obscure sublepidoti cito glaberrimi, vetustiores fusco-cinerescentes. Folia sempervirentia tenuiter coriacea integra elliptica utrinque attenuata, 5–7 cm. longa 1.5–2.5 cm. lata, apice abrupte caudata acumine 1–1.5 cm. longo angusto falcato obtuso, basi oblique cuneata, supra glabra atroviridia nitida siccitate flavo-brunnescentia costa plana nervis obsoletis, subtus discoloria viridi-albescentia costa elevata nervisque primariis lateralibus gracilibus flavescentibus sub lente minute farinaceo-tomentellis circiter 8 sub angulo 50° egressis intra marginem curvatis evanescentibus; petioli circ. 5 mm. longi supra late sulcati parcissime farinaceo-tomentelli demum glabri. Amenta utriusque sexus pauca ad apices innovationum et in axillis foliorum superiorum enata foliis breviora, pauciflora erecta rhachidibus gracilibus angulatis cum alabastris minute pulverulento-albido-puberulis, floribus singulis remotis. Amenta masculina simplicia stricta; bracteae subulatae parvae; flores numquam ultra 30 sessiles; perianthium cupuliforme alte connatum lobis 6 triangulari-ovatis acutis brunneis glabrescentibus; stamina 12 longe exserta, circ. 2.2 mm. longa; antherae ellipsoideae apiculatae; ovarii rudimentum magnum globosum albo-tomentosum. Spicae femininae 3–9-florae erectae solitariae, interdum spicis nonnullis ex axillis bractearum paniculatim aggregatis patentibus; flores parce lepidotuli stipitati stipitibus initio pulviniformibus post anthesin accrescentibus usque ad 2 mm. longis; perianthium cupulatum denticulatum dentibus 6 minutis. Spica fructifera in parte superiorem ramuli annotini lateralis usque ad 5 cm. longa, rhachi tenuia cinerea pulverulento-lepidotula; fructus biennes stipitati solitarii raro 2–3 distantes; cupula patelliformis basi truncata, crasse coriacea fragilis, 14 mm. lata 4 mm. alta, intus griseo-purpurascens puberula, extus cinereo-lepidotula squamis in zonis concentricis obsoletis confluentibus apicibus minute apiculato-denticulatis adpressis glabrescentibus tantum distinctis; glans pro maxima parte exserta ovoideo-turbinata apice attenuata breviter apiculata basi truncata, 12 mm. lata umbone incluso 14 mm. alta initio pruinosa cito glabrata lucida atrobrunnea; cicatrix alte concava 6–8 mm. diametro.

HAINAN: Kan-En Hsien, Hao-Pi Ling, shrub 4 m. tall, in dense woods, Aug. 7, 1936, *S. K. Lau 27634;* Chun-Pai Ling, top of mountain, tree 5 m. tall, in light woods, Oct. 23, 1933, *H. Y. Liang 63718* (TYPE), *63723;* Erh-Fang Ling, top of mountain, tree or shrub 4 m. tall, in woods, Nov. 7, 1933, *H. Y. Liang 63686, 63687;* Erh-Huang Shan, Heng-Po Po, near the peak, tree 20 m. tall, in shaded woods, April 25, 1934, *H. Y. Liang 65268, 66272.*

This species is characterized by small leaves, short flowering and fruiting spikes, and small segregated pedicellate fruits with a shallow fragile cup marked by the minutely denticulate apices of the scales.

Lithocarpus cyrtocarpa (Drake del Castillo) Chun, comb. nov.

Quercus (Pasania) *cyrtocarpa* Drake del Castillo in Jour. de Bot. 4: 150, *pl. 3. fig. 3.* 1890.

Pasania cyrtocarpa (Drake del Castillo) Hickel et A. Camus in Ann. Sci. Nat. Bot. Sér. 10, 3: 408. 1921, in Lecomte, Fl. Gén. Indo-Chine 5: 1003. 1930.

Ad descriptionem addenda:

Arbor 5–12 metralis cortice cinereo ramis ramulisque satis gracilibus teretibus griseo-cinereis crebre lenticellatis primo parce fulvo-tomentosis mox glabratis, gemmis nondum satis evolutis 4 mm. longis ovoideis obtusis adpresse sericeis. Folia per duos annos persistentia brevipetiolata tenuiter coriacea elliptica elliptico-oblonga vel ovato-lanceolata, 5–15 cm. longa 2–4.5 cm. lata, plerumque leviter inaequilateralia breviter sensim vel abruptius acuminata, basi late cuneata vel obtusa, supra costa impressa sordide tomentosa excepta glabra laete viridia lucida crebre venulosa venulis transversis sub lente dense foveolatis, subtus pallidiora in nervis et costa elevata densius in facie sparse fasciculato-pilosa pilis minimis breviradiatis mox evanescentibus, margine integerrima vel crenulata aut apicem versus utrinque denticulis porrectibus distantibus interdum ad callos reductis 4–7 instructa, nervis lateralibus pleraque 13 sub angulo 40° divergentibus sursum curvatis trabeculis numerosis tenuissimis conjunctis, petiolis 5–15 mm. longis tomentosis. Fructus biennis solitarius sessilis ramum anni prioris insidens; cupula plano-scutelliformis circiter usque ad 4 cm. lata crasse lignosa, intus umbilico valde elevato excepta molliter fulvo-velutino-sericea, extus dense squamosa squamis perpendiculariter ortis e basi lata tumida conico-pyramidatis sursum angustato-curvatis intimis majoribus validis ± 3 mm. longis extrinsecus gradatim minoribus extimis minimis aculeiformibus omnes fulvo-tomentosis; glans basi cupulae solum adnata, discoidea vel depresse globosa, 4–4.5 cm. lata 2 cm. alta, atrocastanea apice plana centro paulo depresso conico-umbonata ubique fulvo-tomentosa pilis minimis fasciculatis conglutinatis facile detersis; cicatrix concava pallida rugulosa, 2.6–3.6 cm. diam.

Kwangsi: S. Nan-Ning, Shi-Wan-Ta Shan, alt. 900 m., tree 10 m. tall, in open woods by stream, bark dark gray, branchlets tomentose, gray, leaves thin, pale green beneath, scales brown reflexed, Oct. 21, 1928, *R. C. Ching 8111;* same district, Me-Kong, tree 12 m. tall, leaves smooth green above light green beneath, fruit large brown, compressed, edible, rare, Nov. 3, 1928, *R. C. Ching 8345.* Kwangtung: Yang-Chun Hsien, Chin Shan, tree in mixed woods, bark gray, Nov. 15, 1935, *C. Wang 38773.*

Distribution: Tonkin; New to China.

Lithocarpus dictyoneura, n. sp.

Arbor 18 metralis partibus junioribus inflorescentiisque dense fulvo-floccoso-pilosis, ramulis angulatis gracilibus cito glabrescentibus, ramis teretibus fusco-nigris fere levibus glabratis. Folia persistentia subcoriacea vulgo 10–16 cm. longa et 4–6 cm. lata, maxima 16–25 cm. longa 6–9 cm. lata, prope verticem abrupte caudata acumine falcato angusto 1–2.5 cm. longo, e medio desuper attenuata basi ipsa cuneata, margine subtiliter recurva, supra atro-viridia nitida in sicco atrobrunnea, subtus pallidiora siccitate flavescentia glaberrima, costa media utrinque elevata, nervis utrinsecus 16–20 adscendentibus ante marginem confluentibus cum trabeculis transversis distinctissimis supra insculptis subtus valde elevatis; petioli crassi late sulcati puberuli vix ultra 1 cm. longi; stipulae adpresse

pilosae inferiores ovato-lanceolatae superiores angustiores. Amenta erecta ex axillis foliorum bractearumque in partibus terminalibus ramulorum anni paniculatim aggregata, dense crispato-pilosa pilis fulvis fasciculatis, superiora nonnulla feminea; ♂ 9–15 cm. longa densiflora, rhachidibus gracilibus angulatis florum fasciculis 3-floris inferne dissitis superne approximatis, bracteis 3 triangulari-ovatis acuminatis majora 2 mm. longa, lobis perianthium fere ad basin divisis, staminibus 12 longe exsertis, antheris cordato-ovatis minute apiculatis basi discretis, pistillo rudimento liberi piloso; ♀ 10–18 cm. longa, pauciflora florum fasciculis dispersis 3–5-floris, bracteis lineari-subulatis 1.5 mm. longis, stylis 3 conico-subulatis glabris. Spicae fructiferae in parte superiore ramulorum annotini laterales rhachidibus ramulis aequicrassis 10–16 cm. longis nigris lenticellatis parce puberulis. Fructus biennes sessiles conferti sed vix confluentes glomerulis florum abortivorum interspersi; cupula firme coriacea fragilis circiter 10 cm. lata, nunc cupuliformis dimidio glandem cincta 5–6 mm. alta, nunc depresse hemisphaerica ore leviter contracto glandem (vertice exposito excepto) subinclusa circiter 10–12 mm. alta, intus glabra purpurascens, extus furfuraceo-lepidotula squamis permultis parvis spiraliter confluentibus apicibus triangularibus acutiusculis curvatis adpressis tantum distinctis; glans subglobosa vel conico-hemisphaerica initio pruinosa mox nitida apice stylopodio rotundato umbonata; cicatrix leviter impressa 10–12 mm. diametro.

KWANGSI: Yao Shan, collected under the direction of S. S. Sin, May 24, 1928, *No. 31;* Lo-Hsiang, Nov. 22–25, 1928, *Nos. 3639, 3667* (TYPE); without data, *R. C. Ching 7391.*

This species falls into the group of *Lithocarpus fenestrata* (Roxb.) Rehder from which it differs in thinner leaves with more numerous and unusually prominent, strongly etched lateral veins and veinlets, smaller cups with minute scales, and hemispheric, not ovoid acorns. *Lithocarpus Paviei* (Hick. et A. Camus) Chun* is not unlike in certain respects but in that species the silky pilose acorn is borne on a pedicellate cup.

Lithocarpus Elmerrillii, n. sp.

Lithocarpus silvicolarum (Hance) Chun in Jour. Arnold Arb. 9: 152. 1928; pro parte, quoad descr. foliorum.

Arbor 12–25 metralis fere omnino glabra cortice pallide brunneo ramulis gracilibus angulatis sulcatis fulvo-cinereis in anno secundo satis incrassatis subteretibus obtuse angulatis; gemmae ellipsoideae obtusae brunneae 4–5 mm. longae perulis praesertim interioribus pilosis. Folia biennia longipetiolata, modice coriacea elliptica vel elliptico-oblonga, 7–15 cm. longa 2.5–6 cm. lata, utrinque longe attenuata sursum in caudam falcatam acutam 1–1.5 cm. longam plus minusve subito protracta basi oblique cuneata in petiolo complanato 1.5–3 cm. longo anguste decurrentia, pagina superiora laete viridia nitida inferiora glauca, costa media tenuis supra plana subtus elevata nervis utrinsecus 8–11 subangulo 45° egressis curvatis ante marginem dissolutis subtus moderanter eminentibus venulis transversis supra tantum leviter distinctis. Flores non visi. Spica feminina (tempore fructu) 2–7 cm. longa lenticellata in parte superiore

* **Lithocarpus Paviei** (Hick. et A. Camus) Chun, comb. nov.
Pasania Paviei Hickel et A. Camus in Bull. Mus. Hist. Nat. Paris 29: 603. 1923.

ramulorum annotinorum eios validior subterminales superne flores abortivos dissitos paucos fructum maturum unicum gerens. Fructus biennis sessilis; cupula hemisphaerica, 8–10 mm. alta, pro maxima parte corporis solida vertice vacuo tenui patelliformi 15–24 mm. lato basin glandis solum sustinens, intus sericeo-puberula, extus dense griseo-lepidotula verticellatim squamosa squamis circ. 10-serialibus crebris adpressis inferioribus et mediis ovatis dorso gibboso-convexis mucronatis vel muticis, superioribus latissime deltoideis mucrone brevi-acuminato subglabro terminantibus; glans pro maxima parte exserta ovoidea vel subglobosa castanea glabra nitida, 18–24 mm. alta, apice attenuata umbonata basi truncata; cicatrix profunde concava circ. 2 mm. alta 12–14 mm. diam.

HAINAN: Pao-Ting Hsien, Hsing-Lung, Hsuang-Chi-Na, alt. about 1000 m., tree 12 m. tall, in forests, bark brown, leaves glaucous beneath, Sept. 1, 1935, *F. C. How 73585* (TYPE); same locality, tree 25 m. tall, Sept. 5, 1935, *F. C. How 73637;* Five Finger Mt., Fan-Ya, Dec. 16, 1921, *F. A. McClure 8596.*

The last named specimen, a duplicate of which was presented to the Herbarium of the Botanical Institute, Sun Yatsen University, by Mr. H. Green, late Superintendent of the Hongkong Botanical Garden, had been misidentified as *Quercus silvicolarum* Hance, a very different plant with a thin, fragile cup described by Hance as "cupulis cupuliformibus 10 lin. diametro squammis brunneis tomentellis in lamellas 6 indistinctas denticulatas connatis." The description of the leaves accompanying the new combination under *Lithocarpus*, cited above, is unfortunately based on McClure's specimen which rightly belongs to the new species now proposed. The new species is named after Dr. Elmer D. Merrill, my mentor for over twenty years.

Lithocarpus Haipinii, n. sp.

Arbor 10–12 m. alta cortice levi obscure cinereo; ramuli valdi, circiter 8 mm. diametro, dense molliter initio laete cito sordide fulvo-tomentosi, in anno tertio glabrati griseo-corticati rugulosi foliorum delapsorum cicatricibus magnis deltoideo-ovatis notatis. Folia per duos annos persistentia crasse coriacea bullata elliptica vel obovato-elliptica, 8–12 cm. longa 3.5–7 cm. lata, apice abrupte acuminata acumine lato acuto falcato ± 1 cm. longo, basi rotundata vel late obtusa, margine satis recurva, supra olivacea lucida praeter costae partem inferiorem sordide tomentosam glabra, subtus pallidiora, sicca utrinque brunnescentia, ubique costa venisque magis fasciculato-pilosula, costa subtus elevata e basi lata sursum gradatim attenuata nervis secundariis utroque latere 11–12 tenuibus prope marginem curvatis trabeculis transversis utrinque prominentibus supra quam subtus densioribus conjunctis; petiolus teres 2–3 cm. longus indumento ut in ramulis. Flores ♂ non satis evoluti ex axillis foliorum superiorum anguste paniculati in ramis abbreviatis perpaucis circiter 2–5 cm. longis densifloris sessiles, omnibus partibus molliter tomentosis, bracteis lanceolatis subulatis suffultis. Spicae ♀ in parte superiorum ramulorum terminales erectae rigidae 6–13 cm. longae dense fulvo-tomentosae florum fasciculis inferne dispersis superne approximatis; flores 3–5 fasciculati, juveniles haud visi. Fructus biennes in rhachidibus ramulis anni secundi conformibus aequicrassis longitudinaliter striolatis 12–16 cm. longis 2–7, sessiles congesti sed haud confluentes circa basin

fructibus abortivis dense spinuloso-squamosis cupulae adnatis; cupula cupuliformis lignosa, 0.6 cm. alta 2.2 cm. lata, glandem basi tantum cincta, intus pupurascens circa cicatricem circularem elevatam obscure puberula alibi glabra, extus dense fulvo tomentosa squamis annulatim confluentibus partibus liberis acicularibus reflexis curvatis interdum subtiliter hamatis 6 mm. longis conspicue ornata; glans pro maxima parte exserta turbinata raro ovoideo-globosa, apice umbonata, basi truncata, 2.2–2.5 cm. lata, atrocastanea glabra nitida initio glaucescentia; cicatrix profunde excavata pallida impolita, 12 mm. diametro.

HONGKONG: The Peak above Luggard Road in a ravine, tree 10 m. tall, 40 cm. diam., bark deep gray, leaves very thick, lustrous, pale green beneath, May 19, 1930, *C. L. Tso 21690;* July 2, 1930, *C. L. Tso 21838*, Sept. 9, 1930, *C. L. Tso 22580* (TYPE); in dense wood on slope, tree (past flowering), branching near the base into 5 stems, bark gray smooth, branchlets gray, young shoots densely fulvous pubescent, leaves deep lustrous green bullate, Aug. 18, 1933, *W. Y. Chun 9159;* mature fruits, Sept. 5, 1934, *W. Y. Chun 10020*. KWANGTUNG: Yiao-Ping, Phoenix Mountain, tree 5–10 m. tall, in forest, branchlets brownish tomentose, staminate inflorescence in bud paniculate, April 16–21, 1931, *N. K. Chun 42680, 42743;* Hsin-I District, Ho-Sui, Mu-Lan Tsai, tree 14 m. tall, in mixed forests, spines of involucre green, Aug. 16, 1931, *C. Wang 31171*, *S. P. Ko 51794;* same district Yiang Chai, Hou Shan, alt. 1200 m., tree 1 m., young inflorescence, April 9, 1932, *C. Wang 32055;* Nov. 22, 1934, *C. Wang 37958;* Yu-Yuen District, Ti-Hsia Shan, tree 6 m. tall, in mixed woods, young inflorescence, April 23, 1934, *S. P. Ko 88595;* Tai-Pu District, Tung-Ku Shan, Sept. 8–29, 1932, *W. T. Tsang 21627*. KWANGSI: Ping-Nan, Yao-Shan, Pai-Niu, large tree, on peak in mixed forests, flowers white, May 20, 1936, *C. Wang 39183*.

The acicular reflexed squamae on the fruiting involucre approximate those of *Lithocarpus Garrettiana* (Craib) Chun* and *Lithocarpus Skanniana* (Dunn) Rehd., but in other respects, this new species is totally different from the plants mentioned.

This truly remarkable large handsome tree was first discovered by the writer, when he was about to embark for England in 1930, in Hongkong near the Peak in a small wood behind a residence above Luggard Road. Messrs. C. L. Tso and Li Yiu were put on the alert for ripe fruits which were subsequently collected in abundance and sown in the nurseries of the Botanical Institute and the Hongkong Botanical Garden.

If, as early as 1875, Hance in describing *Castanopsis Lamontii*** should regard it "strange that this fine tree which grows in a locality which must have been many times visited by former collectors, should have so long remained undetected," how much more true is the remark quoted when applied to a companion which openly defied detection for a further period of over half a century.

This new species is respectfully dedicated to the former Chancellor of Sun Yatsen University, Chow-Lu, L.L.D., Leipzig, under whose administration the Experimental Garden of the Botanical Institute became an

* **Lithocarpus Garrettiana** (Craib) Chun, comb. nov.
Quercus Garrettiana Craib in Kew Bull. 1911: 474. 1911.
Pasania Garrettiana (Craib) Hickel et A. Camus in Ann. Sci. Nat. Bot. Sér. 10, 3: 403. 1921.

** Jour. Bot. 13: 368. 1875.

important scientific adjunct of the University. The irreplaceable collection of living plants in the Experimental Garden has since been completely destroyed by Japanese vandalism.

Lithocarpus Howii, n. sp.

Arbor 6–12 metralis cortice fusco-cinereo; rami annotini defoliati patuli sparsi rigidi cinereo-corticati rugosi lenticellis elevatis foliorum delapsorum cicatricibusque magnis subrotundatis conspicue asperati; ramuli juniores cum petiolis dense molliter flavo-sericeo-tomentosi in anno secundo glabrescenti; gemmae late ovoideae, 4 mm. longae, obtusae perulis ovatis obtusis dense sericeo-tomentosis laxiuscule tectae. Folia per duos annos persistentia in apice ramulorum conferta longipetiolata subcoriacea obovato-oblonga, 9–12 cm. longa 2.5–5 cm. lata, apice subito acuta basi oblique cuneata, subconcoloria utrinque in sicco flavescentia, supra nitidula laete viridia, subtus opaca in costa elevata venisque breviter albido-strigillosa margine angustissime cartilaginea revoluta praeter basin dentato-crenata dentibus incurvis haud apiculatis, nervis primariis lateralibus utrinque 16–20 erga costam 6–8 mm. inter se distantibus sub angulo 50° egressis fere rectis supra leviter impressis subtus cum trabeculis transversis crebris prominenter elevatis, petiolis gracilibus superne late sulcatis puberulis, 3.5–4 cm. longis, stipulis lanceolatis acutis, 15 mm. longis 2 mm. latis, caducis, extus dense pilis longis adpressis flavido-sericeis. Flores feminei (emarcidi) in spicis subterminalibus pauciflori ad axem validam erectam puberulam verisimiliter tortuosam bini ternive glomerati sessiles, bracteis crassis turgidis dense tomentosis, stigmatibus divaricatis glabris. Fructus maturus stipitatus, stipite lenticellato 1.5–2.5 cm. longo 8 mm. crasso, durus permagnus turbinato-obpyriformis apice truncatus, basi attenuatus, circiter 5 cm. latus parte attenuato circ. 1 cm. longo incluso 5–6 cm. longus, pericarpio subcoriaceo superne circ. 2 mm. crasso a glande facile soluto pulchre sculpturato processibus e squamis mutatis rostriformibus validis turgidis recurvis conspicue armato; cupula totam glandem obvoluta squamis difformibus inferioribus in zonis indistincte annularibus confluentibus arcte adpressis reliquis finem fructu superpositis liberis confertis, ab infimis ad supremis longitudine variantibus inferioribus elongatis inter se distantibus lanceolatis elevato-marginatis mediis breviusculis sparsioribus intervallis planis separatis superioribus brevioribus liberis erectis confertis plerumque recurvis supremis multo minoribus tenuioribusque arcte incurvis cupulae orem occultis; glans depresse globosa ossea intus basi a dissepimentis induratis incompletis irregulariter 5-locularis sursum 1-locularis; semen fere totam glandem repletum basi alte lobatum, apice conico-umbonatum.

HAINAN: Kan-En District, Pai-Ling, tree 8–10 m. tall, 20 cm. diam., on summit of wooded hill, bark blackish gray, leaves lustrous deep green, Nov. 23, 1933, *H. Y. Liang 63717, 63725;* Ting-An District, Mao-Hsiang, tree 20 m. tall, Dec. 23, 1933, *C. Wang 36005, 36009;* Po-Ting District, Hsing-Lung, Tung-Tieh Ling, alt. 300 m., tree, leaves lustrous green beneath, fruits pale green, July 12, 1935, *F. C. How 73184* (TYPE); same locality, Hsuang-Chi-Na, alt. 800 m., tree 12 m. tall, in forests, bark gray, Sept. 4, 1935, *F. C. How 73630;* Wan-Ning District, Tung-Tieh Ling, tree 10 m. tall, in dense forest, with ♀ spike and detached ♂ fls., Nov. 26, 1936, *S. K. Lau 28249.*

This is one of the most distinct oaks so far discovered in this country. It agrees in all essential characters with the Sect. Synaedrys. There is no

evidence that the staminate spikes in a separate packet accompanying *Lau 28249* really belong to this species, and they are omitted in the description.

This new species is named after the collector, Assistant Professor F. C. How, who since joining this Institute as a young graduate has unwaveringly kept his voluntary pledge to dedicate his life to botany.

Lithocarpus iteaphylloides, n. sp.

Arbor 12–18 m. alta praeter inflorescentiam glaberrima cortice griseo-vel fusco-brunneo ramis ramulisque gracilibus nitentibus junioribus dense foliatis griseis angulatis vetustioribus nigris teretibus fere levibus. Folia biennia subcoriacea lanceolata vel elliptico-lanceolata 5–10 cm. longa 2–3 cm. lata, apice longe obtuseque acuminata basi attenuata et usque ad basin petioli angustissime decurrentia margine integra passim undulata supra viridia nitida subtus pallidiora, costa utrinque elevata nervis primariis lateralibus utrinsecus circ. 16–18 gracillimis infra tantum subtiliter elevatis venulis crebre reticulatis praesertim subtus leviter tantum prominentibus; petioli longitudine in eodem ramo satis variabili 5–15 mm. longi. Inflorescentia masculina in apicibus ramulorum et axillis foliorum summorum paniculata pedunculis communis angulatis incano-tomentosis, amentis 3–6 cm. longis folio brevioribus adscendenti-patentibus, rhachis tereti incano-tomentosa multiflora, floribus singulis sessilibus extus dense incano-tomentosis inferioribus dissitis superioribus congestis; bracteae lanceolatae perianthio paulo longiores; perianthii lobi 6 inaequales ovati acuti circ. 1 mm. longi; stamina 12 exserta 2.2 mm. longa, filamentis supra basin connectivi elliptici adnatis leviter complanatis obscure puberulis, antheris subrotundatis apice distincte apiculato-umbonatis; ovarii rudimentum dense incano-pilosum. Spicae fructiferae laterales in parte superiore ramulorum 5–7 cm. longae; fructus biennes in rhachidibus 5 mm. crassis lenticellatis nigris ternatim aggregati sessiles; cupula cupuliformis lignea 3–4 mm. alta 8 mm. lata basin tantum glandis amplectens intus sericeo-pilosula extus fulvo-tomentosula, squamis adpressis late rhomboideo-ovatis apiculatis circiter 4–5 serialibus; glans ovoidea sursum attenuata apice umbonata glabra graminea lucida circ. 10 mm. lata umbone incluso 12–13 mm. alta; cicatrix concava, circ. 4 mm. diametro.

KWANGTUNG: Hsin-I Hsien, Ho-Hsui, Mu-Lan Chai, tree 12 m. tall, in woods, bark brown, Aug. 16, 1931, *S. P. Ko 51800;* same locality, tree 8 m. tall, in mixed woods, bark gray, flowers yellowish white, April 9, 1932, *C. Wang 32062;* Yen-Fa Hsien, Tung-Lo-Ping, shrubby tree 4–5 m. tall, Dec. 12, 1927, *W. Y. Chun 6000.*

This species differs from *L. Hancei* (Benth.) Rehder in slender blackish not grayish branchlets, much thinner smaller leaves and smaller cup with less distinct scales arranged in fewer zones. From *L. iteaphylla* (Hance) Rehd., with which this new species seems to be more closely allied, it is at once distinguished by the ternately coalescent not solitary acorns. *Lithocarpus ternaticupula* Hayata, of which we have authentic specimens from Formosa, differs in having a thicker deeper cup with prominently swollen scales and larger acorns. These four species belong to a closely related group but seem to be specifically distinct.

Lithocarpus obovatilimba, n. sp.

Arbor parva ad 8 m. alta; ramuli teretes hornotini annotinique pube

dense flocculenti-tomentoso initio flavo mox sordide fusco persistente vestiti, vetustiores glabrescentes nigrescentes crebre rimosi. Folia biennia ad apicem ramulorum conferta brevipetiolata coriacea obovata, 3.5–5.5 cm. longa 2.5–3 cm. lata, apice rotundata vel obtusa vel acumine brevi lato obtuso plus minusve abrupte terminantia, basi cuneata asymmetrica margine satis revoluta in sicco supra intense brunnescentia nitida subtus pallidiora opaca, in vivo e collectore supra atro- subtus argenteo-viridia, utrinque pagina praeter basin costae parce sordide tomentosam glaberrima, nervis lateralibus utrinsecus 5–7 angulo valde obtuso divergentibus tenuibus sursum leviter curvatis intra marginem evanascentibus supra obscure impressis subtus leviter tantum distinctis venulis fere obsoletis; petiolus robustus, supra complanatus, infra semiteres basi dilatatus dense fulvo-tomentosus usque ad 8 mm. longus sed saepius brevior. Flores desunt. Spicae fructiferae in parte superiore ramulorum solitariae rhachidibus ramulis annotini aequicrassis et similiterque indutis circ. 2 cm. longis, fructibus paucis confertis sessilibus basi coalitis, cupulis alte patelliformis 4 mm. altis 12 mm. latis fragilibus intus sericeo-pilosulis extus incano-tomentosis, squamis pluri-serialibus imbricatis laxe adpressis e basi late triangularibus abrupte acuminatis acumine libero erecto calloso-apiculato subglabro brunnescente, inferioribus dorso convexis mediis et superioribus planiusculis supremis cupulam superantibus et eam marginem aliquanto fimbriatis, glande cupulam multo superante ovoidea lucida 12 mm. alta 10 mm. lata, cicatrice concava ± 5 mm. diam.

HAINAN: Ling-Hsui, Ka-She Tu, alt. about 800 m., small tree, in mixed woods, bark gray, leaves deep green above, silvery green beneath, Nov. 9, 1935, *F. C. How 73758*.

In general appearance this species resembles *Lithocarpus glabra* (Thunb.) Nakai but with the leaves much broader in proportion to their length and obovate in outline. In addition, in Nakai's species the scales are closely appressed to the cup and confluent with only their shortly mucronate apices evident.

Lithocarpus podocarpa, n. sp.

Arbor 20 metralis vel ultra praeter inflorescentiam glaberrima ramulis griseis parce lenticellatis obscure rimosi. Folia persistentia tenuiter coriacea oblonga vel elliptico-oblonga 8–10 cm. longa 3–4 cm. lata apice breviter abrupteque obtuso-acuminata basi cuneata discoloria utrinque nitida in sicco supra brunnescentia subtus argentata margine revoluta passim undulata costa utrinque elevata nervis lateralibus in utroque latere 8–10 tenuibus supra impressis subtus elevatis adscendentibus sursum arcuatis versus marginem anastomosantibus trabeculis subparallelis prominulis connexis petiolis sulcatis circ. 1 cm. longis suffultis. Amenta utriusque sexus in parte superiore ramulorum et axillis foliorum summorum erecta, masculina saepius paniculatim aggregata, femina ex axillis bractearum in ramulis aphyllis simplicia pauca. Amenta ♂ 10–15 cm. longa densiflora parce pulverulento-puberula floribus secus axin singulis interruptis vel approximatis, bractea externa triangulari-subulata perianthio breviore bracteisque lateralibus ovato-acutis stipitatis; perianthium cupulatum circ. 1 mm. altum extus furfuraceo-puberulum intus glabrum margine breviter 6 lobatum lobis herbaceis deltoideis obtusis vel

acutiusculis; stamina 12 exserta circ. 3 mm. longa filamentis glabris antheris cordato-ovatis apice apiculatis basi discretis; rudimentum ovarii depresse globosum obscure angulatum pilosum. Spica ♀ 7–14 cm. longa pauciflora infra medium nuda rhachi floribusque furfuraceo-puberulis; flores singuli dissiti stipitati stipite pulviniformi flore subaequilongo, bractea externa subulata minuta; perianthium cupulatum ovario arcte cinctum extus sulcatum margine breviter dentatum dentibus ovatis obtusis; styli 3 divergentes recti obtusi basi pilosi. Fructus biennes secus pedunculum inferne nudum in parte superiore 7–9 aggregati manifeste pedicellati; cupula late pateriformis 14 mm. diametro basi in pedicellum validum 3–5 mm. longum abrupte contracta tenuiter lignosa basi glandem tantum amplectens, intus puberula extus tomentosula squamis 6–7-serialibus apice apiculato excepto omnino confluentibus; glans hemisphaerica aut depresse globosa, 14–15 mm. lata altaque, basi truncata apice umbone conico tomentoso coronata, atrocastanea glabra; cicatrix concava albida 8 mm. diametro.

KWANGTUNG: Yun-Fou Hsien, Cha-Tung, tree "40 m." tall, bark gray-black smooth not fissured, Feb. 1, 1928, *C. C. Wang 553;* same district, Yun-Wu Shan, tree 20 m. tall, flowers white, cup gray, acorn green, Oct. 20, 1934, *C. Wang 37559*, (Bottle No. *C/529*), (TYPE); Fang-Chang, tree 5 m. tall, in ravine, Nov. 21, 1930, *H. D. Wong 39;* Hsin-I Hsien, Ho-Hsui, tree 15 m. tall, in village wood, bark gray, flowers white, Nov. 22, 1934, *C. Wang 37954.* HAINAN: Ling-Hsui, Tung-Chia, Ta-Lan Shan, tree 18 m. tall, in wooded ravine, bark grayish white, acorn green with whitish umbo, cup grayish white, Sept. 24, 1932, *N. K. Chun & C. L. Tso 43916;* Ting-An Hsien, Mao-Hsiang Ling, tree 20 m., in mixed woods, bark gray, Dec. 27, 1933, *C. Wang 35858* (Bottle No. *B/368*); same locality, tree 8–10 m. tall, flowers creamy white, Jan. 9–11, 1934, *H. Y. Liang 64292, 64471, 64472;* Pao-Ting Hsien, Hsing-Lung, tree 11 m. tall, in mixed forests, bark gray, leaves silvery gray-green beneath, acorns lustrous green, Aug. 5, 1935, *F. C. How 73380;* without data, coll. *H. Fenzel s.n.* (B. I. *Herb. No. 17758, 18373*).

This species is at once distinguished from its nearest allies *L. vestita* (Hick. et A. Camus) Chun* and *Lithocarpus Pavici* (Hick. et A. Camus) Chun by its glabrous wholly exserted acorns. The other Indo-Chinese species with pedicellate cups differ from our Chinese species either in connate fruits or cupular structure or markings.

The fruits in some of the Hainan specimens show some variation, ranging from generally hemispheric to depressed globose in form, otherwise all the collections are very uniform.

Lithocarpus tremula, n. sp.

Arbor parva 5–8 metralis praeter ramulos juveniles inflorescentiasque glabra; ramuli hornotini initio parce fulvo-tomentosi cito glabrati anno secundo tertioque subteretes atro-grisei crebre rimosi. Gemmae ovoideo-conicae acutae castaneae squamis ovatis obtusis extus praeter marginem adpresse sericeo-pilosis. Folia triennia longipetiolata coriacea elliptica vel elliptico-lanceolata vulgo 6–9 cm. longa 2–3.5 cm. lata, apice caudato-acuminata acumine falcato obtuso, basi cuneata vel acuta in petiolum breviter extensa, margine integra plana, supra olivacea nitida in sicco flavescentia, subtus pallidiora opaca, costa utrinque elevata vix conspicua,

* **Lithocarpus vestita** (Hickel et A. Camus) Chun, comb. nov.
Pasania vestita Hickel et A. Camus in Ann. Sci. Nat. Bot. Sér. 10, 3: 393. 1921.

nervis lateralibus primariis utrinsecus 7–8 sub angulo 50° divergentibus sursum curvatis tenuibus intra marginem obscure confluentibus, subtus tenuiter elevatis prominulis, venulis fere nullis; petioli infra medium semiteretes sursum manifeste compressi longitudine satis inaequilongi ei foliorum summorum vix ultra 1 cm. longi inferiorum usque ad 3 cm. longi. Flores ♂ non vidi. Spica ♀ ad apicem ramuli 2–3 aggregata erecta simplicia 8–10 cm. longa, floribus cum rhachi validi angulati leviter tortuosi fulvo-tomentosis paucis ternatim interdum quinatim fasciculatis fasciculis dissitis bractea externa ovato-acuminata flore longiore bracteisque 2 lateralibus ovato-rotundatis brevioribus omnibus extus et basi intus pilosis suffultis, perigonio ovario multo breviore breviter 5–6-lobato, stylis 3 brevibus rectis divaricatis obtusis glabris. Spicae fructiferae 16–26 cm. longae moderanter robustae fructibus sessilibus seggregatis juvenilibus saepissime ternatim confluentibus sed unico in eodem fasciculos tantum maturante; cupula hemisphaeroidea lignosa solida basi truncata in parte superiore plano-patelliformis usque ad 12 mm. lata margine leviter curvata vel fere plana, intus purpurascens glabra umbilico centrale valde elevato 6 mm. diametro, extus fulvo-tomentosula concentrice annulata annulis 7–9 passim denticulatis inferioribus distantibus dorso convexis superioribus marginem versus proprioribus planiusculis indistinctis; glandes non satis maturae discoideo-hemisphaericae umbonatae fere omnino exsertae 5 mm. altae 10 mm. latae pallide castaneae nitidae, cicatrice concava 5 mm. lata.

Hongkong: New Territories, Wu-Kau Tien, roadside, tree 5 m. tall, leaves lustrous, pale green beneath fruiting cups reddish brown, Jan. 18, 1930, *N. K. Chun 40213* (type). Kwangtung: Lo-Fou Shan, tree 6 m. tall, in mixed woods, pistillate spikes whitish hairy, July 26, 1930, *N. K. Chun 41383;* same locality, tree 8 m. tall, on bank of stream, Aug. 18, 1930, *N. K. Chun 41619;* Hsin-I, Ho-Hsui, Mu-Lan Chai, tree 8 m. tall, in mixed woods, bark gray, leaves light green beneath, cup gray, Aug. 16, 1931, *C. Wang 31170.*

My nephew, the discoverer of this new species, was attracted to the tree from a great distance by the scintillating foliage when the sun shone on its crown. The rustling tendency of the leaves is due to the partially flattened petioles.

Quercus conduplicans, n. sp.

Arbor 22 m. alta ramulis subangulatis ramisque teretibus gracilibus fusco-nigris initio parce sordideque tomentellis cito glabratis. Folia biennia in apicem ramulorum conferta coriacea longe graciliterque petiolata coriacea discoloria lanceolata, absque petiolo 9–14 cm. longa 2–2.5 cm. lata, apice sensim caudato-acuminata acumine 1–1.5 cm. longo falcato acutiusculo obtusove, deorsum longe attenuata simul inaequilateraliter cuneata, margine cartilaginea subtiliter revoluta supra medium crenato-dentata dentibus utroque latere 6–7 calloso-mucronatis, utrinque glaberrima in sicco brunnescentia, supra subnitida costa impressa vel leviter sulcata nervis primariis tenuissimis cum trabeculis transversis crebris pariter prominulis inter se eximie connexis, nervis primariis lateralibus utrinque 9–11 adscendentibus distantibus fere rectis atque costa elevata subtus satis eminentibus prope marginem dissolutis et haud in dentem excurrentibus venulis ultimis tantum leviter perspicuis; petiolus supra leviter planus sulcatusque, basi dilatatus, minute puberulus, usque ad 2.5 cm. longus interdum brevior. Flores desunt. Fructus ut videtur

biennis solitarius sessilis in ramulo pedunculiformi valido tereti folio breviore subterminalis; cupula e basi hemisphaerica lignosa in limbum circularem latum crassum coriaceum subito ampliata ubique (intus basi excepta) densissime brunneo-lanuginoso-velutina extus concentrice zonata annulis circiter 5–7 crassis integerrimis supremo a margine remoto; cupula propria cupuliformis ore expanso 10–12 mm. lato, intus 6 mm. alta quartem partem glandis amplectens; limbus explanatus 3–3.5 cm. latus sursum deorsum undulatus margine passim conduplicatus plicis saepius 6 extrorsim adsurgentibus intervallis plus minusve intrusis decurvis vel valde revolutis separatis; glans cylindrica apice umbonata umbone conico incluso 2.5–3.2 cm. longa, medio 1.2–1.6 cm. lata, atrocastanea apice basique saepius plus minusve adpresse fulvo-sericeo-pilosa; cicatrix plana circ. 5 mm. diam.

Species inter Asiaticas cupularum configuratione diversissima.

KWANGTUNG: Yao-Ping Hsien, Phoenix Mt., tree 22 m. tall, leaves dark green above, pale green beneath, acorn dark brown, cup with brownish velvety tomentum, April 21, 1931, *N. K. Chun 42741* (Bottle No. *DD/7*).

This remarkable species is unlike any other known to us in the peculiar structure of the cupule. The cupule is composed of two parts different from each other in texture, a cup proper, hemispheric and woody, and an abruptly expanded broad circular limb which, in the living state must presumably be fleshy, eventually becomes thickly coriaceous and strongly undulate with conduplicate upwardly curving folds alternating with decidedly indented and more or less revolute intervals.

Quercus gracilenta, n. sp.

Arbor 15 m. alta trunco 40 m. diametro; trunci cortex crassus extus atro-brunneus subtus purpurascens, levis numquam fissus tantum reticulato-striatus; ramuli novelli gracillimi distincte angulati sulcatique initio fulvo-floccoso-tomentosi cito glabrescentes annotini subteretes fusco-nigri lenticellis parvis obscure dispersi. Folia per duos annos persistentia longipetiolata tenuiter coriacea adulta glabra lanceolata elliptico-lanceolata vel -oblanceolata 6–9 cm. longa 1.5–3 cm. lata, apice acute breviter acuminata acumine tenui interdum curvato circ. 6 mm. longo, deorsum longe attenuata basi oblique cuneata margine cartilaginea anguste revoluta supra medium crenato-denticulata dentibus gracilibus calloso-apiculatis, supra atro-viridia nitidissima in sicco laete luteo-viridia subtus opaca siccitate flavescentia, nervis lateralibus tenuibus utrinque 12–16 sub angulo 55° a costa divergentibus fere rectis sed apicem versus leviter curvatis supra planis subtus elevatis reticulo venularum utrinque prominulo, petiolis gracilibus basim versus fulvo-floccoso-tomentosis 1.5–2 cm. longis. Flores ♂ non visi. Spica feminea axillaris erecta 12 mm. longa ramulis aequicrassa, ubique fulvo-floccoso-tomentosa floribus 3–4 sessilibus singulis versus apicem pedunculi teretis approximatis, stylis 4 brevibus divaricatis apice peltatis bilobulatis. Fructus biennis solitarius sessilis; cupula campanulata crassa 2.8 cm. longa 2.4 cm. diam., extus intusque dense fulvo-velutino-tomentosa concentrice zonata annulis 9–11 subaequidistantibus arcte adpressis integris marginem leviter incrassatis; glans pro maxima parte inclusa obturbinato-cylindrica medio umbonata 3 cm. longa 1.5 cm. lata initio tenuiter fulvo-tomentosa mox glabrescentia; cicatrix plana 6–7 mm. diam.

KWANGTUNG: Kiangsi border, Lung-Chuen, San-Chi Kou, tree 15 m. tall, on roadside, leaves lustrous deep green above, dull pale green beneath, pistillate flowers and fruits brown tomentose, April 29, 1930, *C. L. Tso 21629*.

This new species differs from *Quercus pachyloma* Seem. in the thin elliptic leaves with the upper part of the margin sharply crenate-dentate from or below the middle, in the more numerous close lateral veins very distinct on the upper surface, as well as in the larger acorns. In *Q. pachyloma* the leaves are thicker, not distinctly veined on the upper surface with fewer veins ending in callose not apiculate teeth.

Quercus nemoralis, n. sp.

Arbor 15 metralis partibus juvenilibus pilis fasciculatis densis brevibus arcte adpressis initio flavescentibus deinde incanis diu persistentibus tectis, ramulis gracilibus obtuse pentagonis 5-sulcatis anno secundo tertioque valde incrassatis atro-corticatis lenticellis minutis conspersis tarde glabrescentibus. Folia biennia crasse coriacea rigida longipetiolata oblonga raro oblanceolato-oblonga sursum in acumen falcatum obtusiusculum subito attenuata basi oblique producta, 10–16 cm. longa 3.5–5 cm. lata, margine infra medium usque ad apicem remote crenato-dentata dentibus callosomucronatis, supra laete viridia in sicco pallide flavo-viridia adulta glabrata costa plana pulverulento-tomentosa, subtus glauca siccitate albescentia vel canescentia praecipue secus costam elevatam nervosque fasciculato-pilosa, nervis lateralibus eminentibus utroque latere 9–13 adscendentibus fere rectis tantum paululum curvatis ad serraturas excurrentibus; petioli graciles teretes 2–4 cm. longi, basi dilatati. Flores ♂ desunt. Spicae ♀ (post anthesin) in axillis foliorum superiorum solitariae ut videtur 1-florae vix ultra 1 cm. longae fructibus nascentibus sessilibus; bracteae fugaceae; ovarium ovoideum tenuiter tomentosum perianthio 2-annulato dense tomentoso integro pro maxima parte circumdatum; styli 5 divaricati subulati sursum glabrati apice peltato-expansi. Fructus verisimiliter semper solitarius pedunculo ramo anni crassiore petiolis breviore suffultus; cupula hemisphaerica, basi truncata, circiter 2.5 cm. lata, intus adpresse fulvo-sericeo-pilosa extus flavescenti-tomentosa concentrice zonata zonis 9–11 inferioribus crassis distantibus grosse eroso-dentatis vel -denticulatis superioribus minimis propioribus integerrimis supremis incurvis; glans semi-exserta cylindrica rubro-brunnea umbo conico 5 mm. longo incluso 4–5 cm. longa 2.5 cm. diam., adpresse fulvo-pilosa pilis derasis evanescentibus, cicatrice convexa pallida 1.2 cm. lata.

HAINAN: Ting-An Hsien, Lung-Wan, tree 15 m. tall, with gray bark, in mixed woods, Jan. 23, 1934, *C. Wang 36843* (TYPE); Po-Ting Hsien, Hsing-Lung, Hsuang-Chi-Na, alt. about 800 m., tree 14 m. tall, with brown bark, Aug. 27, 1935, *F. C. How 73518*.

This species is perhaps closest to *Q. zanthoclada* Hick. et A. Camus from Indo-China from which it is easily distinguished by the dense yellowish to grayish indumentum on the branchlets petioles and lower surface of the leaves, and by the hemispheric cup with many more concentric zones which are erose, at least the lower ones.

Quercus patelliformis, n. sp.

Arbor 12 m. alta ramulis fuscis striatis anno secundo griseo-nigris lenticellis parvis conspersis. Gemmae obovoideo-oblongae obtusae 5 mm.

longae perulis inferioribus late triangulari-ovatis superioribus oblongis obtusis glabris castaneis marginibus purpurascentibus minute ciliolatis. Folia biennia firme coriacea longipetiolata elliptico-oblonga 5–12 cm. longa 2.5–6 cm. lata, apice in acumen gracilem caudatum falcatum 1.5 usque ad 3 cm. longum gradatim contracta, basi rotundata obtusave interdum late acuta, margine parce incrassata revoluta supra basin crenato-dentata dentibus remotis mucrone calloso lato obtuso incurvo terminantibus, supra obscure viridia glabra costa plana, subtus pallidiora in sicco brunnescentia costa elevata nervis utrinsecus 9–11 sub angulo 45° divergentibus leviter curvatis elevatis trabeculis transversis utrinque leviter tantum distinctis venulis ultimis dense reticulatis subfoveolatis; petiolus tenuis semiteres supra planus 2–4 cm. longus. Flores masculinus ignotus. Spicae femineae e medio rami anni axillares 2–2.5 cm. longae erectae, rhachis tenuis angulata glabra pauciflora floribus singulis alternis sessilibus, praeter involucri hemisphaerici apicem tenuiter pilosum glabrescentibus, perianthio breviter 6-dentato dentibus triangularibus acutis, stylis alte connatis erectis apice trilobatis lobis capitato-dilatis incurvis. Fructus biennis singulus sessilis pedunculo valido lenticellato vix ultra 1 cm. longo suffultus; cupula patelliformis 2 cm. lata 4 mm. alta exigue marginata, intus adpresse sericea umbilico lato convexo prominente notata, extus adpresse tenuiterque flavido-tomentosa annulatim zonata zonis 8–9 inferioribus 5–6 erosis superioribus integris vix manifeste propioribus; glans depresse hemisphaerica apice subrotundata vel planiuscula medio umbonata umbone conico incluso 2–2.2 cm. alta 2.5–2.8 cm. lata, dense fulvido-stellato-tomentosa; cicatrix convexa ± 2 cm. lata.

HAINAN: Yai Hsien, tree 15 m. tall, Oct. 1, 1933, *C. Wang 34414;* Kuei-Kai Shan, Nan-Lin, tree 12 m. tall, in mixed woods, Oct. 16, 1933, *C. Wang 34658* (TYPE); Kan-En Hsien, Shan-Man-Tou, tree 12 m. tall, bark blackish gray, fruit brown, Sept. 3, 1933, *H. Y. Liang 63355;* Chuang-Kou Ling, tree 12 m. tall, brown tomentose, Oct. 8, 1933, *H. Y. Liang 63421;* Ling-Hsui Hsien, Seven Finger Mts., Jan. 14, 1934, *C. Wang 36696.*

This species is characterized by highly connate columnar styles, and a somewhat depressed hemispheric acorn borne on a shallow cup with a narrow rim. It may be compared with the Indo-Chinese *Q. chrysocalyx*, *Q. asymmetrica* and *Q. Dussaudii* Hick. et A. Camus., differing from the former two in the coriaceous leaves and the non turbinate acorns, from the last-named in the dentate leaves and the smaller shallower cup, and from all three in the stylar structure.

Quercus phanera, n. sp.

Arbor ultra 10 m. alta (fide Liang) fere undique glabra cortice rami ramulique nigrescenti ramulis tenuibus angulatis foliosis in anno secundo moderanter incrassatis verruculosis. Gemmae ovoideo-oblongae obtusae angulatae castaneae nitidae 6 mm. longae 3 mm. latae, perulis pluris imbricatis ovatis obtusis dorso parce pilosis margine ciliatis alibi glabris Folia perennia rigide coriacea oblanceolato-elliptica 3.5–7 cm. longa 1.5–3 cm. lata apice abrupte breviterque acuta basi cuneata plus minusve in petiolum anguste decurrentia, supra atroviridia nitidissima subtus pallidiora, margine cartilaginea valde revoluta e medio vel versus apicem irregulariter crenato-denticulata denticulis haud apiculatis interdum ad crenulas indistinctas reductis, costa supra plana subtus elevata, nervis

lateralibus primariis utrinsecus plerumque 9 adscendentibus curvatis infra marginem evanescentibus subtus valde elevatis cum venulis subparallelis subtransversis numerosissimis eminentibus insigniter connexis, petiolis vix ultra 1 cm. longis. Flores ignoti. Pedunculus fructiferus circ. 1 cm. longus teres validus lenticellatus in axillis foliorum prope apicem ramuli annotini solitarius; fructus biennis subterminalis singulus sessilis; cupula conico-hemisphaerica tenuiter lignosa 1.8 cm. alta 2 cm. lata quartem partem glandis amplectens ore leviter constricto, intus adpresse fulvo-sericeo-pilosa extus tenuiter flavescenti-tomentosula concentrice zonata zonis 11–12 levibus tenuibus inferioribus 6 latis fere aequidistantibus grosse erosis intermediis 2 angustioribus propioribus erosulis, reliquiis proximis integris; glans cylindrica vertice truncata crasse umbonata basi leviter attenuata tota pilosa pilis adpressis fulvo-sericeis diu persistentibus, usque ad 4 cm. longa 2 cm. lata umbone conico 4 mm. alto concentrice 7–9 annulato; cicatrix convexa alte extrusa circ. 10 mm. diametro.

HAINAN: Heng-Po-Po, vicinity of Loy village, tree over 10 m. tall, in dense woods along trail, bark gray-black, leaves deep lustrous green, acorn hairy, Feb. 21, 1934, *H. Y. Liang 65095.*

A species in the alliance of *Q. Edithae* Skan and *Q. cambodiensis* Hick. et A. Camus, differing from both in the glabrous vegetative parts, the strongly reticulate leaves, the more numerous annular rings on the cup, and the much larger cylindric acorns.

Quercus Sinii, n. sp.

Arbores vel frutices fructibus juvenilibus exceptis fere undique glabri. Ramuli juniores graciles angulati cani lenticellis paucis parvis ellipticis conspersi, vetustiores subteretes atro-cinerei verruculosi. Folia ut videtur per hiemen haud persistentia tenuiter coriacea longipetiolata siccitate atro-brunnea fere concoloria in eodem ramulo satis variabilia, hunc e basi rotundato-ovata vel ovato-oblonga, nunc basi obtusa cuneatave ovato-lanceolata, minora 5–6 cm. longa 1.8–2 cm. lata, majora usque ad 10 cm. longa et 4 cm. lata, apice sensim acuteque acuminata acumine magis quam vulgo lato plus minusve 1.5 cm. longo falcato raro fere recto, basi plerumque inaequilateralia plerumque rotunda rarius obtusa vel breviter acuta in petiolum abrupte breviterque contracta, margine subcartilaginea anguste revoluta supra basin dentato-serrulata serraturis sparsis antrorsum adsurgentibus e basi lata sursum attenuatis apice crasse mucronatis vel spinulosis mucronis spinulisve usque ad 5 mm. longis incurvis interdum porrecto-adscendentibus, supra glabra subtus erga costam mediam praesertim in axillis nervorum stellato-tomentosa, costa tenuis supra plana subtus elevata nervis lateralibus primariis 10–12 adscendentibus sursum leviter curvatis et in dentem excurrentibus cum secundariis subtransversis crebris tertiariisque dense reticulatis eximie conjunctis supra subtusque pariter distinctis; petiolus 8–20 mm. longus gracilis semiteres, supra sulcatus, sordide fasciculato-tomentosus pube facile detersibili. Flores desunt. Fructus annuus (in specimine unicus tantum satis maturus) foliorum superiorum axillis singuli vel bini breviter spicati, pedunculo 8–12 mm. longo ramis anni crassiore tereti glabro crebre rimoso; cupula sessilis tenuis alte cupuliformis 14 mm. lata 8 mm. alta fere totam glandem amplectans, basi attenuata ore leviter constricta, intus argenteo-pilosa, extus fulvo-incano-tomentosa imbricatim squamosa squamis 7–9-serialibus

arcte adpressis parvis dorso plus minusve tumidis imis oblongo-ovatis obtusiusculis aliis ovatis obtusis; glans graminea late ovoideo-conica apice graciliter umbonata praeter apicem stylopodii pilosum glabra, circ. 9 mm. lata, absque umbone 8 mm. alta; cicatrix convexa circ. 4 mm. lata.

KWANGTUNG: Yunfou, alt. 130 m., on rocky hill, small tree about 6 m. high, bark gray, Sept. 21, 1928, *S. S. Sin 5240.*

The nearest ally seems to be *Q. setulosa* Hick. et A. Camus, an inadequately described Annamese plant known only in very young fruit, from which the Chinese tree differs in longer petiolate generally ovate leaves, dentate from near the base and terminated by an unusually broad acumen. The fruits, though not exactly comparable in stage of growth, in our species have less distinct but more tumid cup-scales and are borne on a much shorter and stouter peduncle.

This new species is named after Professor S. S. Sin, former Head of the Biology Department of Sun Yatsen University, under whose able and energetic direction several expeditions despatched to little known regions in Kwangsi and Hunan procured much new phytogeographic data of great scientific interest and value. The collections, as yet only partially studied, are proving to be unusually rich in undescribed species.

BOTANICAL INSTITUTE,
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A NEW LACTIFEROUS PLANT IN SOUTH CHINA

Woon-Young Chun

AND

Ying Tsiang

Parabarium Huaitingii Chun et Tsiang, sp. nov.

Frutex ramosus scandens usque ad 13 m. altus (e collectore), praeter lobos corollae cinereo- vel rufo-tomentellus, ramis ramulisque teretibus robustis irregulariter et longitudinaliter striolatis 2–3 mm. crassis lenticellatis, internodiis 2–5 cm. longis. Glandulae inter- et intrapetiolares complures caducissimae nigrescentes subulato-lineares 1 mm. longae. Folia ad apicem ramulorum disposita tenuiter chartacea vel adulta crassiuscula utrinque molliter pubescentia, subtus pilis ad nervos densioribus, ovato- vel oblongo-elliptica margine leviter revoluta apice acuta vel breviter acuminata basi anguste rotundata raro late cuneata superne intense viridia subtus pallidiora 2.5–7.5 cm. longa et 1.5–3.5 cm. lata, in speciminibus fructiferis maxima 11 × 4.5 cm., costa nervisque superne planiusculis et subtus conspicue elevatis, lateralibus utrinsecus usque ad 10 arcuato-adscendentibus ante marginem anastomosantibus, petiolo tomentoso usque ad 5 mm. longo. Pleiochasia subterminalia vel raro axillaria congesta corymbiformia confertiflora 4–6 cm. alta, bracteis foliaceis 1–3 cm. longis et 0.5–1 cm. latis, pedicellis filiformibus, 1–2 mm. longis. Gemmae obtusae. Flores fragrantes (e collectore). Calyx subcampanulatus extus tomentellus quincuncialiter partitus, segmentis oblongo-lanceolatis obtusis 2 mm. longis et 1 mm. latis, squamulis intracalycularibus 5 minutis; corolla flavescens urceolato-rotata extus puberula intus basi dense pubescens excepta glabra, tubo 2 mm. alto, fauce nuda et ampliata basi constricta, lobis dextrorsum obtegentibus et sinistrorsum contortis in aestivatione apicibus ovatis obtusis abrupte inflexis, post anthesin patentibus et valvatis 2 mm. longis et basi 1 mm. latis; stamina prope basim tubi inserta filamentis perbrevibus antheris lanceolato-sagittatis; discus tenuiter 5-lobatus; carpella ovarii 2, pilosa utrumque circiter 10-ovulatas; stylus perbrevis; caput stigmatis turbiniforme apice obscure bifidum. Folliculi gemini vel abortu singuli ovato-lanceolati basi dilatati et apicem versus attenuati 6–7 cm. longi et basi 1.5–2 mm. diametro, epicarpio basi rugoso et supra medium striolato; semina linearioblonga atrofulva pubescentia basi acuta et apice fere truncata 10–15 mm. longa et 2–3 mm. lata, comis albo-sericeis verticillatis circiter 3 cm. longis; embryo longiusculo, cotyledonibus radicula subaequalibus; cotyledones albae oblanceolatae utrinque obtusiusculae 7 mm. longae et 2 mm. latae; radicula cylindrica ultra 6 mm. longa.

Kwangsi: Shih-Wan-Ta Shan, Hsiang-Tze, scandent shrub 6 m. in ravine, Feb. 7, 1944, *S. H. Chun 4514;* same locality, scandent shrub 13 m., flowers light yellow, fragrant, April 30, 1944, *S. H. Chun 5027* (type in Bot. Inst., Sun Yatsen Univ.); Nan-Ning, roadside, scandent shrub 6 m., June 17, 1944, *S. H. Chun 5305;* Yung

Hsien, Ta-Tseh-Tsuen, vine climbing on trees, fruit greenish, Aug. 12, 1933, *A. N. Steward & H. C. Cheo 800;* same locality, on open slope, scandent shrub 4 m., Nov. 18, 1938, *H. C. Hoh 82524;* without data, *Univ. Kwangsi 83952, 92952.* KWANGTUNG: Yang-Shan, along stream, fruit green, July 30, 1936, *L. Tang 225;* Lun Hsien, in ravine, Oct. 1, 1945, *S. H. Chun 5547.*

The genus *Parabarium* Pierre is characterized by compact, corymbose cymes with the apices of the corolla-lobes abruptly inflexed in aestivation, and by follicles which are prominently dilated at the base and somewhat abruptly attenuated upwards into a long, slender beak. In indumentum, *P. Huaitingii* approaches *P. velutinum* Pitard, but the Indo-Chinese species, in addition to other morphological characters, is at once distinguished by much larger leaves of a different form, larger inflorescence and fruits. On account of the densely flowered inflorescence and the form of the fruit, our plant seems to be more closely allied to *P. micranthum* (Wall.) Pierre, but that species, like all other species hitherto ascribed to the Chinese flora and enumerated by the junior author in 1934,* are totally glabrous.

In the spring of 1944, the governments of Kwangtung and Kwangsi jointly dispatched a botanical party into the interior of the Shi-Wan-Ta Shan, Kwangtung-Kwangsi border, in search of gummiferous plants furnishing possible substitutes for rubber. The survey and identification of the plants collected were entrusted to this institute. Our collector, S. H. Chun, succeeded in gathering over thirty species belonging to various families and orders, all producing more or less abundant latex, those of the Apocynales including *Chonemorpha macrophylla* (Roxb.) G. Don, *Parabarium micranthum* (Wall.) Pierre, and the newly proposed species described above being the most promising. The latex was first coagulated by acetic acid in the field, and upon refining by government laboratories, has been found, at least in some cases, to be serviceable in the electrical and automobile industries.

This new species, which undoubtedly will become economically important, is named after and dedicated to Professor Tang Tsic Yee, Dean of the College of Agriculture, Sun Yatsen University, to whose support our Institute owes much of its progress, and through whose life-long devotion to his chosen field, scientific agriculture in South China is beginning to benefit the daily life of the people.

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* Sunyatsenia 2: 117–125. pl. 24–25, f. 7. 1934.

NOTES ON THE DATES OF ISSUE OF DESVAUX'S JOURNAL DE BOTANIQUE

E. D. Merrill

Volume one of this short-lived periodical is dated 1808, it being made up of six numbers, 64 pages each, for the months of October, November, and December, 1808 (pp. 1–192), and January, February, and March, 1809 (pp. 193–384). Volume two is dated 1809, and its six parts, also of 64 pages each, are indicated as April, May, June, July, August, and September, 1809; these dates appear on the fascicle covers of the set in the Arnold Arboretum library. It is evident from certain corroborative data recently located that Desvaux was able to conform to his announced plan of publication, fascicle covers p. 4: "Ce Journal paroît dans le première huitaine de chaque mois, à compter du mois d'octobre 1808."

An "Avis aux souscripteurs" pasted on the fascicle cover of volume two, no. 6, and repeated on page 4 of the fascicle cover of this number reads in part: "Des mutations arrivées dans la Maison de commerce qui s'étoit chargée d'abord de faire paroître le Journal de Botanique, obligent les auteurs de suspendre cet ouvrage, jusqu'au mois janvier prochain . . . ." Desvaux's plan was then to issue a new periodical commencing in 1810 under the title Annales de Botanique; this plan was never consummated, but beginning in 1813 he did issue several volumes of another run of the Journal de Botanique, the remainder of the title considerably modified. The full title of the first two volumes (1808–1809) was: Journal de Botanique, rédigée par une société de botanistes; that of the second run (1813–1816) was: Journal de Botanique, appliquée a l'agriculture, a la pharmacie, a la médicine, et aux arts. It is not surprising that some botanical authors have confused these two runs of what were different periodicals under the same leading name, one in 1808–09, the other 1813–16.

The correctness of the indicated dates of issue of various parts of these two periodicals have been questioned, but certain contemporaneous reviews have recently been located which clearly prove that the years and months indicated for the first two volumes of the first Journal de Botanique are correct in spite of a statement by Desvaux (see below) that would seem to indicate that a later date (1810), was involved. From these reviews it is clear that there was at least some distribution of all of the individual numbers within the month indicated for each number, or in some cases actually in the preceding month.

The first statement that I noticed in reference to this periodical was by Rafinesque, Atl. Jour. 1: 207. 1833, where he indicated the date of certain

reprints of his papers as 1809; it is barely possible that one of these came out in 1808, however. Later I noticed Fernald's statement, Rhodora 34: 26. 1932, which is:

"The title page of Desvaux's Journal de Botanique, tome 1, is dated 1808, but Rafinesque himself stated in Atlantic Journal, i. 207 ("Winter of 1833") in his Cronological Index of his own botanical writings, that the paper was 'reprinted in Desvaux' Journal of Botany, Paris, 1809.' Desvaux complicated the question by himself stating in a volume dated 1814 that 'Nous avons publie en 1810, deux Volumes de 384 pages chacun et de 12 gravures' (see Fernald, Rhodora, xxix, 227 (1927). Since Vol. 1 (dated 1808) is the only one of the two volumes with 384 pages and 12 plates (Vol. 2 having 384 and 13 plates), we have Desvaux's word that it did not come out until 1810."

One suspects that Desvaux perhaps meant to say that by 1810 he had published two volumes, or perhaps there was not much distribution of the various issues before that date. Suspecting that the Journal général de la Litterature de France might throw some light on the actual dates of publication of Desvaux's periodical, and also on other botanical works issued in France between the years 1798 and 1841, a somewhat systematic examination of that serial was initiated. The data noted in reference to the two volume set of the Desvaux Journal de Botanique are summarized in the next paragraph.

Volume 1, no. 1, pp. 1–64 October, 1808 was reviewed Jour. Gén. Litt. France 11: 258 [September] 1808*; no. 2, pp. 65–128, apparently not recorded, but the fascicle cover date is November, 1808; no. 3, pp. 129–192, December, 1808, is reviewed in the November-December number of the Jour. Gén. Litt. France 11: 323. 1808. The next three numbers were apparently not recorded, but the fascicle cover dates are: no. 4, pp. 193–256, January, 1809, but the date at the bottom of the cover is 1808, so this part may actually have been printed in 1808; no. 5, pp. 257–320, February, 1809; no. 6, pp. 321–384, March, 1809.

Volume 2, no. 1, pp. 1–64, April, 1809, is reviewed op. cit. 12: 100. 1809, this being in the April issue; nos. 2 and 3, pp. 65–192, May and June, are reviewed op. cit. 12: 130, May, 1809; no. 4, pp. 193–256, July, is reviewed op. cit. 12: 194, the July number; and no. 5, pp. 257–320, August, is reviewed op. cit. 12: 227, August, 1809. No entry was noticed for No. 6, this including pp. 321–384; its fascicle cover date is September, 1809.

The evidence here is that the editors of the Journal général de la Litterature de France actually received copies of the various issues of

* The parts do not actually bear the month of issue, but rather "premier cahier," "second cahier," etc. The serial was planned for twelve numbers annually, the *premier cahier* of each volume to be issued in January of each year. On the fascicle covers, however, many of which I have seen in unbound copies of volumes 23 (1820) to 27 (1824) the volume and part numbers, month, and year appear thus: "Vingt-troisième année Janvier 1820 — Premier Cahier," there being twelve numbers, one for each month of the year.

Desvaux's Journal de Botanique as they were issued. There would therefore appear to be no cause for doubting the correctness of the dates of issue as originally published, for Desvaux apparently was able to live up to his plan of issuing a number each month and in the first eight days of each month; in fact some of the numbers actually were printed in the month preceding the one indicated on the fascicle covers.

The record as to the dates of issue of the "second series" is unfortunately not so clear and doubts have been cast on the correctness of some of them. It was Desvaux's original plan to start an entirely new periodical in 1810 as noted above, but apparently the times were not propitious. Three years later he did initiate another serial but used the same general title that he had for the first attempt, i.e., Journal de Botanique. Of this new serial four volumes were issued, the third volume apparently never completed.

Fernald, Rhodora 20: 227. 1927, in his discussion of *Dendrium* Desv. and *Loiseleuria* Desv., for which he correctly accepts the date of publication as 1813, says: "Nevertheless, European bibliographers apparently have recent information (its source as yet unknown to me) that the part of vol. iii, or Ser. 2: 1, containing *Dendrium* (p. 36) and *Loiseleuria* (p. 35) was not issued until 1814." However, No. 1, pp. 1–48, although neither the number nor the pagination is indicated, is clearly the part reviewed in the Jour. Gén. Litt. France 16: 30. 1813, as determinable from the titles of the papers cited. This would be the January number for the year 1813 and the entry proves that number one of this new Desvaux Journal de Botanique was actually issued in 1813 and not delayed until 1814. My attention had been called to an item in Bertolini's Flora Italica 2: 377. 1835, in his discussion of *Primula suaveolens* R. & S. in which he refers to an entry in Desvaux's Journal de Botanique "tom. 4. p. 76. anno 1813," which seemed to confuse the issue. Checking the reference, however, indicated an error on Bertolini's part, for the *Primula suaveolens* entry is in Desvaux's Jour. Bot. 2: 76. 1813, not in volume four, again confirmation that volume two was issued in 1813.

As Fernald notes, the signatures (every 16 pages) are dated at the bottom of the first page of each beginning with p. 49, February, 1813, and continuing to June, 1813 (p. 273). It is not claimed that these monthly dates are actually the dates of issue, but this might well be the case. This system of dating the signatures was continued through volume 2, p. 1, July, 1813, to p. 257, December, 1813, but was abandoned in volumes three and four. Volumes three and four are dated 1814. On page 285 of volume four Desvaux says: "Les trois derniers Numéros du 3.e volume pour 1814, paraîtront avec les premiers Numéros du 5.e volume commençant l' année 1815." This explains, in part, the incomplete volume three but throws no light on the difficulties that the editor may have had with the printers. In all but one of the sets of this periodical that I have seen, volume three closes abruptly with page 192, and I judge that it was

Desvaux's plan to issue four numbers of 48 pages each. It is worthy of note that the set in the library of the New York Botanical Garden contains pages 193 to 240 of the volume under discussion, this indicated as no. 5, May, 1814. But a footnote on page 197 clearly indicates that it could not have been published before February, 1816; see Hazen, Bull. Torr. Bot. Club 56: 531. 1929. The fifth volume promised by Desvaux for 1815 never appeared, and apparently also only certain fugitive issues of the last part or parts of volume three for 1814 were actually distributed. I know of only the New York copy of vol. 3, no. 5, never having seen a reference to an existing copy of no. 6. I have seen no fascicle covers of any of the numbers of this second run of Desvaux's Journal de Botanique. Apparently the unsettled conditions in Paris associated with the fall of the first empire in 1814, and the first year or two of the restoration were not conducive to regularity in publication of technical periodicals.

ARNOLD ARBORETUM,
HARVARD UNIVERSITY.

ON THE IDENTITY OF BRANDISIA SOULIEI BONATI

E. D. Merrill

With one plate

On examining the proofs of Dr. Li's paper on *Brandisia,* this Journal, p. 136 his correct elimination of Bonati's species as a representative of this genus was noted. At the time Li's paper was prepared it was impossible to secure special information from European centers. With the improvement in communications following the termination of hostilities it impressed me as desirable to see if the excluded Bonati species of *Brandisia* could be more definitely placed. Suspecting that the type was preserved in the Paris herbarium I appealed to Dr. H. Humbert of the Muséum d'histoire naturelle, who courteously sent me an excellent photograph of the holotype. An examination of this rather clearly indicated that the family Scrophulariaceae was not involved but that probably *Brandisia Souliei* Bonati actually belonged in the Labiatae.

Turning to Bonati's description it is evident that he did not examine the structure of the ovary, for all that he says regarding the innermost set of floral organs is "stigmate bifido, lobis brevissimis. Capsula ac semina?" Feeling that it was essential that the structure of the ovary be checked I appealed to Dr. F. Gagnepain who reëxamined the type and reported: "Je me hâte de vous informer: Que cette espèce est une Labiacée; 1° parce qu'elle a le stigmate particulier à cette famille; 2° parce que j'ai vu très nettement au moins 2 nucules sur le podogyne au fond du calice. La chose est donc jugée; ce n'est pas une Scrophularicée. Je n'ai pas eu le temps de faire de plus amples recherches et de trouver le genre de Labiacées auquel appartient cette espèce litigieuse."

On the basis of the additional information courteously supplied by Dr. Gagnepain, the conclusion was reached that the genus *Chelonopsis* Miquel (Labiatae), as currently interpreted, was represented by Bonati's species, and after a consideration of the published descriptions of the proposed species that further *Brandisia Souliei* Bonati (1909) was identical with *Chelonopsis albiflora* Pax & K. Hoffm. (1922). So convinced am I as to the specific identity of the two, one erroneously placed in the Scrophulariaceae, the other correctly in the Labiatae, that on the basis of the original descriptions and without having seen specimens representing either of the species, the Pax and Hoffman one is reduced to synonymy and the following adjustment in nomenclature is made:

Chelonopsis Souliei (Bonati) comb. nov.

Brandisia Souliei Bonati, Bull. Soc. Bot. France 56: 467. 1909.

Chelonopsis albiflora Pax & K. Hoffmann ex Limpricht in Repert. Sp. Nov. Beih. 12: 477. 1922.

The species is apparently known only from the collections on which the two descriptions were based, and all three of the cited specimens came from Batang [Pa-an], Province, Eastern Tibet [=Sikang Province, China], *Soulie 5199*, "Yargòng," collected in 1904 and *Limpricht 2221, 2230* "Bejü-Batang" and "Batang-Litang," collected in 1914, the last two numbers being the basis of *Chelonopsis albiflora* Pax & K. Hoffm. "Batang" is Pa-an, and what Soulie and Limpricht designated as eastern Tibet, at least as to the "Batang" plants, is now Sikang Province, China.

The published descriptions agree with each other closely. One of the striking characters even in *Chelonopsis*, is that most of the leaves are in whorls of threes. The three collections came from the same general region, but unless duplicates of the Limpricht collections were distributed to other centers previous to the destruction of the Berlin herbarium, perhaps the Bonati collection is the sole extant representative of the species.

Naturally a botanist studying the Labiatae as did Dunn* in his consideration of the Labiatae of China cannot be censured for having overlooked a species erroneously described some years earlier and misplaced in the system not only as to the genus but also as to the family; Dunn recognized four species of *Chelonopsis* as occurring in China. Nor can Pax and Hoffman be blamed for overlooking an ample earlier description of a species that they described as new and for the same reason. This is an excellent illustration of the fact that to describe a new species is a very simple procedure, but to place a suspected new species in its proper group and to determine whether or not a proposed species is actually "new," (i.e., previously unnamed and undescribed) is another matter.

EXPLANATION OF PLATE

PLATE I

Photograph of the holotype of *Brandisia Souliei* Bonati = *Chelonopsis Souliei* (Bonati) Merrill. Courtesy of Dr. H. Humbert, Muséum d'histoire naturelle, Paris.

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* DUNN, S.T. A Key to the Labiatae of China. Notes Bot. Gard. Edinb. 6: 127–208. 1915.

Chelonopsis Souliei (Bonati) Merrill

NOTES ON SOME CULTIVATED TREES AND SHRUBS, V

Alfred Rehder

Chamaecyparis obtusa f. **Sanderi** (Sander), comb. nov.

Juniperus Sanderi Sander ex Masters in Gard. Chron. ser. 3, 25: 287 (1889), nom. subnud. — Beissner in Mitt. Deutsch. Dendr. Ges. 1899(8): 116 (1899), pro syn. — Unger in Mitt. Deutsch. Dendr. Ges. 1900(9): 69 (1900), pro syn. — Anon. in Möller's Deutsch. Gärtn.-Zeit. 15: 589, fig. (1900), nom. subnud.; cf. p. 246, 428.

Chamaecyparis obtusa ericoides hort. Jap. ex Boehmer, Cat. 1899–1900 (suppl.): 2 (1899), nom. nud. — Beissner in Mitt. Deutsch. Dendr. Ges. 1901(10): 77 (1901), nom. subnud.; 1903(12): 51 (1903, Dec.); in Möller's Deutsch. Gärtn.-Zeit. 18: 291, fig. (1903, June 20); Handb. Nadelh. ed. 2, 556, fig. 142 (1909). — Hornibrook, Dwarf Conif. 41, fig. (1923) "var." — Rehder in Bailey, Cult. Evergr. 216, fig. 41 (1923). — Non *Retinispora obtusa* var. *ericoides* Hoopes (1868).

Retinispora Sanderi (Hort.) Sander in Gard. Chron. ser. 3, 33: 266, fig. 111 (1903); no. 852 (Suppl.), fig. 107 (p. ii) (1903, April 25), nom. subnud.

Cupressus pisifera var. *Sanderi* Dallimore & Jackson, Handb. Conif. 219 (1923), nom. tentat.

Juniperus sabina Ungeri Anon. in Gartenwelt, 33: 290, fig. (1929).

Juniperus sabina Sanderi Anon. in op. cit. 291 (1929), pro syn.

This juvenile form has been listed by most recent authors as *Chamaecyparis obtusa ericoides* Boehmer, a nomen nudum first validated in 1909 by Beissner (l.c.). This name, however, should be considered a later homonym of *Retinispora obtusa* var. *ericoides* Hoopes (1868), since *Retinispora obtusa* Sieb. & Zucc. and *C. obtusa* Endl. are synonymous. *Retinispora obtusa* var. *ericoides* Hoopes is based chiefly on *Chamaecyparis ericoides* Carr. (1855); there can, however, be no doubt that *C. ericoides* Carr. does not belong to *C. obtusa,* but represents a juvenile form of *C. pisifera,* namely *C. pisifera* f. *squarrosa* [Zucc.] Beiss. and partly *C. thyoides* f. *ericoides* (Carr.) Rehd. As the epithet *ericoides* has been applied to forms under three different species in the genus *Chamaecyparis,* and may therefore cause confusion, its rejection in favor of *Sanderi,* about which there can be no doubt as to the plant meant by it, is in accordance with the spirit of the Rules of Botanical Nomenclature (see Art. 4), even if *Retinispora obtusa* var. *ericoides* Hoopes and *Chamaecyparis obtusa* var. *ericoides* Beissner are not homonyms in the strict sense of the word; moreover, the first two figures of this plant were published under the names *Juniperus Sanderi* and *Retinispora Sanderi.*

In the note in Gard. Chron. ser. 3, 25: 287 (1899) on *Juniperus Sanderi,* it is stated that *J. Sanderi,* a Japanese species, was introduced by F. Sander & Co., about 1896, but I have not been able to verify this statement.

Carya sect. **I. Pacania** (Raf.), comb. nov.
Hicoria subgen. *Pacania* Rafinesque, Alsogr. Am. 65 (1838).
Hicoria subgen. *Drimocarya* Rafinesque, l.c. (1838), p.p.
Carya sect. II. *Apocarya* C. de Candolle in De Candolle, Prodr. 16,2: 144 (1864).
Hicoria sect. *Apohicoria* Dippel, Handb. Laubh. 2: 336 (1892).
Hicoria [sect.]. *Apocarya* Sargent, Silva N. Am. 7: 135 (1895).

The oldest subdivisional name for this section has been generally overlooked, but as it was validly published with a description and reference to the species belonging to it, it must replace the name *Apocarya* C. de Candolle. For the second group, I have retained the name *Eucarya* C. de Candolle, since its circumscription agrees exactly with that adopted here, while it seems doubtful which of the names of the three subgenera into which this group was split by Rafinesque should have preference.

×Malus purpurea (Barbier) Rehder f. **pendula** (Bean) Rehder, comb. nov.
×*Pyrus purpurea* var. *pendula* Bean, Trees Shrubs Brit. Isl. 3: 327 (1933).

This is a pendulous form of × *M. purpurea* (Barbier) Rehder (in Jour. Arnold Arb. 2: 57. 1920), a hybrid between × *M. atrosanguinea* [*M. Halliana* Koehne × *Sieboldii* (Regel) Rehder] and *M. pumila* var. *Niedzwetzkyana* (Dieck) Schneider. No mention is made by Bean, who published the first reference to it, when and where this form originated.

Rhododendron macrophyllum G. Don f. **album**, f. nova.

A typo recedit flore albo.

OREGON: Junction City, Lane Co. *J. E. Barto*, May 3, 1930 (in herb. Arnold Arb.).

The specimen collected by J. E. Barto bears on the label the varietal epithet *album* which agrees with the fact that its flowers are white even in bud. This is the only specimen with white flowers in the herbarium of the Arnold Arboretum and there is none at all in the Gray Herbarium; all other specimens collected in flower have the corolla more or less rose-colored to rose-carmine. In none of the floras of the West Coast is any mention made of a white-flowered form, although the original description of *R. macrophyllum* G. Don (Gen. Hist. Dichlam. Pl. 3: 843. 1834) says: "*corolla alba*"; only those later authors who keep *R. macrophyllum* and *R. californicum* as distinct species describe the flowers of the former as smaller and white. This separation is apparently only based on the color as given in G. Don's description. It appears, however, that G. Don was in error when he ascribed white flowers to this Rhododendron collected by Menzies at Port Townsend, for in his journal edited by C. F. Newcombe in 1923, under the title "Journal of Vancouver's Voyage, April to October, 1792" Menzies refers twice to this Rhododendron, on p. 20* as *R. ponticum* and on p. 49 as "that beautiful native of the Levant, the purple Rhododendron"; apparently he identified the Rhododendron of the Vancouver region which is in general appearance similar to *R. ponticum* L., with that species he knew from Europe and probably from plants cultivated in England, whence it was introduced in 1763 from Gibraltar. As there

* Called by the editor *R. californicum* in a marginal note.

occurs no other species of the subgenus *Eurhododendron* on the West Coast of North America but *R. macrophyllum* G. Don (*R. californicum* Hook.), the specimens collected by Menzies and compared by him with the purple flowered *R. ponticum* could not have been the apparently extremely rare white-flowered form; the explanation seems to be that the flowers of the specimens were faded and discolored and looked as if they might have been white, as they do in some of the more recently collected specimens before me.* Don also describes the filaments as glabrous, which they are not, not even in the white-flowered form; they are densly pubescent at least at the lower third. A specimen from the type-locality, Port Townsend, Jefferson Co., coll. J. Wm. Thompson, no. 10639, June 9, 1934, has pink flowers up to 6 cm. across and rather large leaves, 9–15 cm. long. Size and color of the flowers are not concomitant characters, nor have they any connection with the geographical distribution; a specimen from Monterey has one of the smallest flowers that I have seen, about 3 cm. across and they are pink.

Ligustrum sect. **Euligustrum**, nom. nov.

Ligustrum sect. III. *Baccatae* Mansfeld in Bot. Jahrb. 59, Beibl. 132: 42 (1924).

Decaisne was the first to subdivide the genus into groups of which he distinguished four without, however, giving names to his sections [in Fl. des Serres, 22: 4–11 (1877) and in Nouv. Arch. Mus. Hist. Nat. Paris, sér. 2, 2: 17–37 (Monog. Ligustrum Syringa.) (1879)]. Of the first of these sections characterized by "Flores hypocrateriformes" Koehne published in 1904 as sect. *Ibota* a monographic treatment in Festschr. 70 Geburtst. Ascherson, 189–208, 4 fig. (Abstract in Mitt. Deutsch. Dendr. Ges. 1904 (13): 68–76, 6 fig. [1905]). In 1924 Mansfeld divided the genus into three sections and the second section into two subsections, using for his section III, a form of name contrary to usage and, moreover, the adjectives in plural are treated as of feminine gender which is grammatically incorrect (see also my proposal of changes of Art. 26 of the Rules of Botanical Nomenclature in Jour. Arnold Arb. 20: 269. 1939). I propose, therefore, to change the name sect. *Baccatae* to sect. *Euligustrum*, since it contains the type-species of the genus.

Ligustrum vulgare f. **nanum** (Kohankie), grad. nov.

"Privet Lodense" (*Ligustrum nanum compactum*) Jackson & Perkins, Fall-Price-List, 1924: 15 (1924), cum descr.

Ligustrum lodense Glogau in Gartenwelt, 32: 658 (1928), nom. subnud. — Henry Kohankie & Son, Price List, Fall 1930: 54 (1930). — Rehder, Man. Cult. Trees Shrubs, ed. 2, 784 (1940) "Lodense."

Ligustrum vulgare nanum Henry Kohankie & Son, Price List, 1945–46: 76 (1945), nom.

A typo speciei recedit habitu compacto nano, 0.75 m. vix excedente,

* Of an original specimen of *R. macrophyllum* collected by Menzies and preserved in the herbarium of the British Museum of Natural History, Mr. J. Ramsbottom kindly sent me a photograph recently taken by Dr. Bernice Schubert, and informed me that the flowers showed a uniform light brown color and might easily have been taken as having originally been white.

ramis erectis vel suberectis. Folia ovato-oblonga vel rarius anguste oblonga, 2–4 cm. longa et 0.6–1.5 cm. lata, obtusa vel acutiuscula, basi late cuneata vel cuneata.

CULTIVATED SPECIMENS: Arnold Arboretum, no. 710–37 (no. 18331) and no. 977–25, *A. Rehder*, Sept. 12 and Oct. 5, 1946.

This form of *Ligustrum vulgare* differs from the typical form in its dwarf and compact habit, with upright and ascending branches. It originated in the nursery of Henry Kohankie & Son at Painesville, Ohio, some time before 1924 and was first offered for sale in 1924 by Jackson & Perkins under the name "Privet Lodense" with the descriptive synonym *Ligustrum nanum compactum* added in parenthesis. The word "Lodense" does not represent, as seems to have been assumed by some, a Latin adjective, but is formed by contracting the two words "low" and "dense," descriptive of the habit of the plant; it is intended as the English or horticultural name of this plant and should not be considered a botanical epithet.

Ligustrum ovalifolium f. **aureum** (Carrière) Rehd., grad. nov.

Ligustrum ovalifolium aureum Carrière in Rev. Hort. 1862: 314 (1862). — Bean, Trees Shrubs Brit. Isl. 2: 27 (1914) "var."

Ligustrum ovalifolium variegatum Bull ex T. Moore in Proc. Hort. Soc. Lond. 5: 138, 144 (1865).

?*Ligustrum japonicum* var. *tricolor* Jacob-Makoy, Cat. no. 114 (1870) ex E. Morren & C. de Vos, Index Bibliogr. Hort. Belg. 555 (1887), nom. — Meehan in Meehan's Monthly, 2: 42, fig. (1892) "tricolored"; nom. subnud.

Ligustrum californicum robustum variegatum Carrière in Rev. Hort. 1877: 352 (1877).

Ligustrum ovalifolium robustum aureo-marginatum hort. ex Dippel, Handb. Laubh. 1: 135 (1889).

Ligustrum californicum aureum hort. et *L. elegantissimum* hort. ex [Nicholson] Kew Hand-List Trees Shrubs, 2: 93 (1896), pro syn.

Ligustrum ovalifolium var. *aureo-marginatum* Hort. ex Rehder in Bailey, Cycl. Am. Hort. [2]: 913 (1900); Man. Cult. Trees Shrubs, ed. 2, 786 (1940).

Ligustrum ovalifolium var. *robustum variegatum* Hort. ex Rehder, l.c. (1900), pro syn.

Ligustrum ovalifolium aureo-variegatum hort. ex Schelle in Beissner et al., Handb. Laubh.-Ben. 418 (1903), nom.

There can be but little doubt that all the names cited above belong to *Ligustrum ovalifolium* f. *aureum*, except perhaps the doubtful *L. japonicum* var. *tricolor* Jacob-Makoy, of which I have seen no specimen; certainly Meehan's figure of it does not represent a form of *L. japonicum* Thunb. which has coriaceous evergreen leaves and would not be hardy near Philadelphia. Moreover, the name *L. japonicum* has often been applied in garden and horticultural literature to *L. ovalifolium*.

Ligustrum Vicaryi (Beckett) (*L. ovalifolium* f. *aureum* × *L. vulgare*), hybrida nova.

Ligustrum Ibota aureum Vicarii E. Beckett in Aldenham House Garden Surpl. Pl. 1923: 14 (1923); 1929: 27 (1929), nom. subnud.

Ligustrum Ibota Vicaryi Lemoine, [Cat.] no. 198(1924–25): 11 (1924), nom. subnud. — Besant in Gard. Chron. ser. 3, 100: 82 (1936) "var."

Frutex ramulis glabris. Folia elliptica vel ovato-elliptica, 2–4, rarius ad 6–7 cm. longa, acuta vel breviter acuminata, ad basin ramulorum

minora 1.5–2 cm. longa et interdum obtusiuscula, basi late cuneata, glabra, partim lutea, petiolis 2–4 mm. longis. Panicula 3–6 cm. longa, axi et ramulis sparse et minute puberulis; pedicello et calyce glabro; corolla tubo 3 mm. longo, longitudinem limbi dimidio excedente; staminibus limbum paullo excedentibus vel subaequilongis. Fructus subglobosus, 4 mm. diam.

CULTIVATED SPECIMENS: Arnold Arboretum, no. 332–36 (from New York Botanic Garden as *L. ciliatum Vicaryi*), *A. Rehder*, July 1 and October 5, 1946, (TYPE); no. 668–33 and 500–36 (from Boyce Thompson Inst., Yonkers, N. Y., as *L. ciliatum Vicaryi*), *E. J. Palmer*, July 5 and October 17, 1938; Hort. Vilmorin, Verrières, France, *Roger L. de Vilmorin*, 1927; Coolidge Coll., San Diego County, Calif., July 1919 and May, 1920, *F. G. W.* (as *Ligustrum* sp.).

This Ligustrum apparently originated some time before 1920 in the garden of Vicary Gibbs of Aldenham, Middlesex, England, famous for his collection of rare trees and shrubs. Its characters suggest a cross between *Ligustrum ovalifolium* f. *aureum* and *L. vulgare*. In its general appearance it resembles very much *L. ovalifolium* f. *aureum*, but the influence of *L. vulgare* is indicated by the more compact and smaller inflorescence with its axis and branchlets puberulous, and particularly by the shorter corolla-tube which is only about 1½ times as long as the corolla-lobes, while in *L. ovalifolium* it is two to three times as long as the lobes, and in *L. vulgare* shorter than the lobes. The shape of the leaves is much like that of *L. ovalifolium*, but the variegation is more irregular than in its f. *aureum* and the leaves of the weaker branches are often entirely green. Since writing the preceding description proposing this plant as a hybrid of *L. vulgare* and *L. ovalifolium*, my attention has been drawn to a note by J. W. Besant in Gardeners' Chronicle (l.c.) in which he calls *L. Ibota* var. *Vicaryi* "a variant from the common and oval-leafed Privets" which apparently means a hybrid between *L. vulgare* and *L. ovalifolium*. It may be considered a confirmation of the correctness of calling this plant a hybrid between these two species, that the same explanation of its origin is based on two entirely different and independent sources. The fact that the pollen of this plant is normal can not be considered a proof against its hybrid origin, for pollen sterility, though prevalent in hybrids, cannot be considered an infallible character of hybridity, for there are hybrids with normal pollen, as × *Platanus acerifolia* (Ait.) Willd. (*P. occidentalis* × *orientalis*).

Ligustrum Tschonoskii Decne. var. **macrocarpum** (Koehne), comb. nov.

Ligustrum macrocarpum Koehne in Festschr. 70. Geburtst. Ascherson, 201, fig. 3, B (1904); in Mitteil. Deutsch. Dendr. Ges. 1904 (13): 76, fig. 6 [1905]; in Repert. Sp. Nov. Reg. Veg. 1: 10 (1905).

Ligustrum medium hort. ex Koehne, op. cit. 203 (1904), pro syn.; non Franchet & Savatier [1878].

Ligustrum acuminatum var. *macrocarpum* Schneider, Ill. Handb. Laubh. 2: 807, fig. 508 l-n (1911).

Ligustrum ciliatum var. *macrocarpum* Mansfeld in Bot. Jahrb. 59, Beibl. 132: 68 (1924).

As *L. macrocarpum* is apparently not specifically different from *L. Tschonoskii*, the above new combination becomes necessary.

Vitex Negundo L. var. **heterophylla** (Franch.), comb. nov.

Vitex chinensis Miller, Gard. Dict. ed. 8, *V.* no. 5 (1768). — Nakai, Fl. Sylv. Kor. 14: 38, t. 12 (1923).

Vitex incisa Lamarck, Encycl. Méth. Bot. 2: 612 [1788]. — Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. 2: 126 (Enum. Pl. Chin.-Bor. 52. 1833) (1835). — Merrill in Lingnan Sci. Jour. 5: 158 (1927).

Vitex Negundo sensu Curtis in Bot. Mag. 11: t. 364 (1797), non Linnaeus (1753).

Vitex laciniatus Hort. ex Schauer in De Candolle, Prodr. 11: 684 (1847), pro syn.

Agnus castus incisa Carrière in Rev. Hort. 1870: 415 (1871).

Vitex incisa var. *heterophylla* Franchet in Nouv. Arch. Mus. Hist. Nat. Paris, sér. 2, 6: 112 (Pl. David. 1: 232. 1884) (1883). — Rehder in Sargent, Pl. Wilson. 3: 374 (1916), in obs.

Vitex Negundo var. *incisa* (Lam.) C. B. Clarke in Hooker f., Fl. Brit. Ind. 4: 584 (1885). — Rehder in Sargent, Pl. Wilson. 3: 373 (1916). — P'ei in Mem. Sci. Soc. China, 1,3: 106 (Verbenac. China.) (1932).

The above new combination was necessary since according to Art. 58 of the Rules of Botanical Nomenclature the oldest varietal name has to be used for the new ternary combination.

As I stated in the discussion under *Vitex Negundo* var. *incisa* (in Sargent, Pl. Wilson. 3: 374. 1916) Franchet's *V. incisa* var. *heterophylla* can hardly be separated as a distinct variety or form from *V. Negundo* var. *incisa* (Lam.) C. B. Clarke, and if united, Franchet's varietal name has priority over *V. Negundo* var. *incisa* (Lam.) C. B. Clarke.

Vitex Negundo var. **heterophylla** f. **multifida** (Carr.), comb. nov.

Agnus castus incisa var. *multifida* Carrière in Rev. Hort. 1870: 416 [1871].

Vitex incisa var. *multifida* Schneider, Ill. Handb. Laubh. 2: 594, fig. 384m-n (1911).

Vitex Negundo var. *incisa* f. *multifida* (Carr.) Rehder in Bailey, Stand. Cycl. Hort. 6: 3481, 3574 (1917) "*V. N.* f. *multifida*," p. 3574.

A form of *V. Negundo* var. *heterophylla* with deeply pinnatifid leaflets and narrow remote segments.

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NOTES ON TWO SPECIES OF ARAUCARIA IN NEW GUINEA AND A PROPOSED NEW SECTION OF THE GENUS

C. T. White

On my way back to Australia from the Solomon Islands in November, 1945, I was delayed at Lae in New Guinea, awaiting transport, and decided to visit the Bulolo Valley at Wau for the purpose of seeing the fine Araucaria forests of that region.

Before the war, Wau was the centre of the gold-mining industry of the Mandated Territory of New Guinea, and the town and surrounding district carried a white population of approximately 2000. Lack of transport had fortunately prevented the exploitation of the magnificent forests of *Araucaria Klinkii* Lauterb. and *A. Cunninghamii* Ait. These two species grow intermingled and dominate the rain-forest on the ridges and hillsides. The former is an especially magnificent tree and Mr. J. B. McAdam, Chief of the New Guinea Forest Service, informs me that he still hopes to find a specimen 300 ft. high. By actual measurement he has found trees approaching this height, but not quite attaining it. The following notes on their systematics and their distribution in New Guinea are offered.

Araucaria Cunninghamii Ait. in Sweet, Hort. Brit. 475. 1827; F. Muell. Vict. Nat. 4: 121. 1887, Descript. Notes Pap. Pl. 9 (2): 65. 1890; Lauterb. in Engl. Bot. Jahrb. 50: 51. 1913; C. E. Lane-Poole, Forest Resources Papua and New Guinea 73. 1925; C. T. White in Jour. Arnold Arb. 10: 200. 1929.

New Guinea: Mt. Obree, Sayer (ex Lauterb. l.c.), *C. E. Lane-Poole 376*, Feb. 1921 (young cones); Hanep, common along the ranges on each side of the Ramu from 2000–4000 ft. alt., *C. E. Lane-Poole 639*, Feb. 1924 (immature cones); Owen Stanley Range, between Mts. Brown and Clarence, *L. J. Brass*, May 1926 (leaves only); Wau, alt. 3000 ft., common on ridge rain-forest above the Bulolo River, *C. T. White*, N.G.F. *1465*, Nov. 1945 (young cones and broken fallen cones; large tree 150 ft., bark thick rough, dark brown almost blackish).

Distribution: E. Australia and E. New Guinea.

Lauterbach, l.c., mentions that he could find no difference between Sayer's specimen and the type from E. Australia. The species is abundant in Eastern New Guinea on the Owen Stanley Range and ranges north of it. The trees in the field are very similar to those of Australia, where the species is very common from sea-level to an altitude of 3000 ft. and shows considerable variation in form. I have compared the New Guinea specimens available to me with much Australian material and can find no essential differences. The closely allied *A. Beccarii* Warb. from north-west New Guinea, judging from figures published by Miss Gibbs in the Phytogeography and Flora of the Arfak Mts., p. 84, fig. 5, seems to differ chiefly in the very much larger cone and cone-scales, the latter measuring 4 cm. × 8 cm. (exclusive of the indurated point) whereas in *A. Cunninghamii* Ait. they only average half this size.

Araucaria Klinkii Lauterb. in Engl. Bot. Jahrb. 50: 48. 1913; C. E. Lane-Poole, Forest Resources Papua and New Guinea 72. 1925.

NEW GUINEA: Mountains of the Upper Waria River, 2000 m. and more above sea-level, *Klink*, TYPE, Nov. 1910 (ripe cones); mountains behind Finschhafen, alt. 2000–3000 ft., on the hills of the Upper Ramu River, *C. E. Lane-Poole 642* (leaves only); Wau, alt. 2500 ft., abundant in rain-forest ridges and hillsides above the Bulolo Valley, *C. T. White*, N.G.F. *1454*, Nov. 1945 (green male amenta and fallen cones; large tree 200 ft., bark very dark brown thick and rough).

As is well known, the species of *Araucaria* fall naturally into two well-defined sections:

(1) COLYMBEA Endl. in which the leaves in adult trees are large and more or less spreading, the cones large, the seeds heavy and not adapted to wind-distribution, cotyledons hypogeal, endosperm transferred in germination into the underground swollen hypocotyl.

(2) EUTACTA Endl. in which the juvenile leaves are acicular and spreading, the adult ones small and imbricate, the seeds comparatively light and with the accompanying winged scale, adapted to wind-distribution, cotyledons epigeal and spreading in germination like those of *Pinus*, hypocotyl slender.

Lauterbach (l.c.) placed *A. Klinkii* Lauterb. in the section EUTACTA, where I feel that its true affinities lie. However, Pilger in the second edition of Die Natürlichen Pflanzenfamilien transferred it to the section COLYMBEA. The only affinity with this section is the large size and more or less spreading character of the leaves. He also includes here the closely allied *A. Hunsteinii* K. Sch. and *A. Schumanniana* Warb. Warburg (Monsunia 1: t. 10) figures both these species and shows their leaves to be more spreading than in *A. Klinkii* Lauterb. In the field, on the general appearance of the branchlets, these three trees certainly resemble members of the section COLYMBEA more than EUTACTA, but in the more essential features, the character of the seed and scale, and the method of germination, they definitely agree with the section EUTACTA. The description of EUTACTA could be amended to include these New Guinea species, but it seems preferable to propose a new section to include them.

Sectio **Intermedia** sect. nov.

Folia juvenilis acicularia, patentia, parva, adulta magna (5–10 cm. longa) patentia vel leviter imbricata; semina cum squamis alatis a ventis disseminata, cotyledonibus 2 in germinatione patentibus supra terram portatis.

Three species in North-east New Guinea, *A. Hunsteinii* K. Sch., *A. Schumanniana* Warb. and *A. Klinkii* Lauterb. though it is possible that all three represent forms of one rather variable species. The two former are unfortunately known only from the type localities.

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